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THE PARKS OF CHICAGO

Inadequate to Imperative Needs—Do Not Compare Well with Other Large Cities—What Should and Could Be Done to Remedy the Evil

By Thomas Hawkes *

THE well being of the inhabitants of large cities greatly depends on the capacity, character, and accessibility of their public parks, They are great factors in regard to morale and health. No city can afford to be lacking in extent of ground devoted to such necessary purposes.

EXTENT OF PARK AREA OF PRINCIPAL CITIES

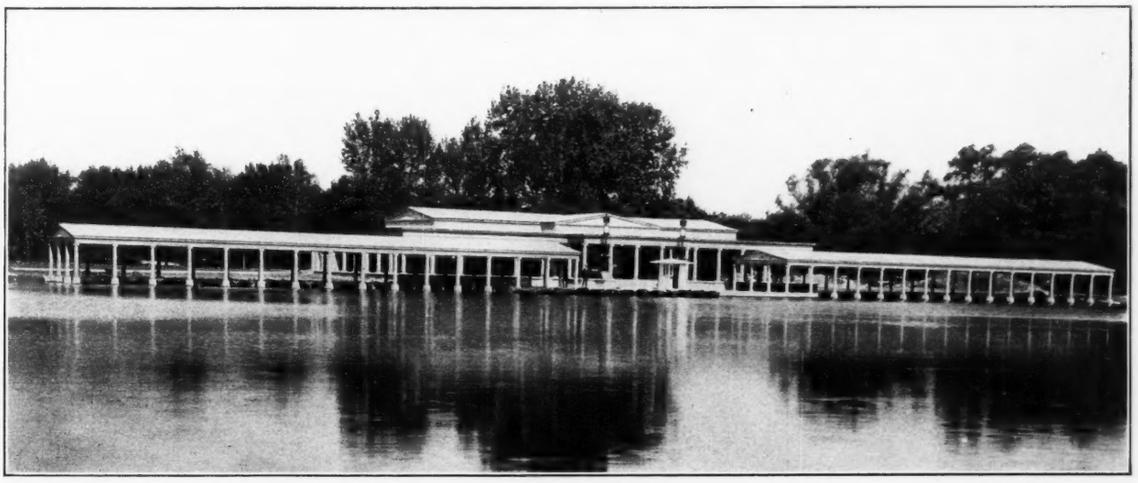
That this subject has been given considerable attention in each community is certain. It is, however, only by obtaining data, and by comparing different park systems, and taking into consideration local conditions, that a conception can be formed as to what that extent should be. The result of the collective judgment of different cities in this matter must not be disregarded.

Boston, Philadelphia, Baltimore, New York and Chicago supply respectively, 165 1/3, 135¾, 110, 85½ and 58½ square feet.

If the Boston parks are not too extensive for her inhabitants it would follow that the other cities mentioned are insufficiently supplied. This fact appears to be emphasized in New York and particularly so in Chicago.

Regarding park areas in the light of open spaces, it must be considered that New York is, to a great extent, compensated for her lack of park area by being surrounded by water, while Chicago has but one water-front and consequently should have more park area per capita than that of New York.

St. Louis, with a population of about one-third that of Chicago,



NEW BOAT HOUSE AND PAVILION, WASHINGTON PARK

Chicago has been wont to boast of her magnificent park system and it will probably be a matter of surprise to many to learn that she is in this respect woefully behind her sister cities.

Unquestionably the inhabitants of Boston do not consider their park system too extensive, and they give to each of their inhabitants 203½ square feet of park area, while St. Louis, Philadelphia, Baltimore, New York and Chicago supply respectively, 165 1/3, 135¾, 110, 85½ and 58½ square feet.

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Regarding park areas in the light of open spaces, it must be considered that New York is, to a great extent, compensated for her lack of park area by being surrounded by water, while Chicago has but one water-front and consequently should have more park area per capita than that of New York.

St. Louis, with a population of about one-third that of Chicago, has a park system practically equal to Chicago's in extent. Taking St. Louis as a standard, for the purpose of comparison, it would be necessary to allow to New York, from her hygienic position, fifty per cent. advantage over St. Louis, to show that her park system is sufficiently extensive. Assuming that this is the case, and that an allowance to Chicago of 25 per cent. advance over St. Louis for a similar consideration should be made it would be apparent that Chicago's present park area should be more than doubled.

* Landscape Architect, Chicago.

LAKE MICHIGAN BEACH ALONG JACKSON PARK

New York, with a population of 3,437,000 and an area of 209,218 acres, has a park area of 6,837 acres.

Chicago, with 1,689,000 inhabitants and an area of 122,000 acres, has a park area of 2,285 acres.

Philadelphia, with a population of 1,293,000 and an area of 84,933 acres, has a park area of 4,005 acres.

St. Louis, with a population of 575,000 and an area of 39,277 acres, has a park area of 2,184 acres.

Boston, with a population of 560,000 and an area of 27,251 acres, has a park area of 2,620 acres.

And Baltimore, with a population of 508,000 and an area of 21,190 acres, has a park area of 1,284 acres.

Splendid Showing for Boston

We have the anomoly of Boston, a city with one-third the population, possessing an area of parks one-fifth greater than Chicago. It is true, however, that, immediately adjoining Boston, there are many other populated districts which her parks serve.

Chicago has a large number of parks but the greater part of them are small, and are not entitled to be called by that name, but for the purpose of enumerating them in this article all the open spaces devoted for public purposes are so termed. They then number sixty-one. Of these thirty-six are under control of the city and their total area is ninety acres. They average two and one-half acres, the largest being some eighteen acres in extent and the smallest about one-eighth of an acre. Many of these small parks are unimproved and can only be located on the map.

The park systems of Chicago are divided into three separate organizations, each administered by its own Board of Commissioners. The South-side park system contains 1,243 acres; the West-side park system contains 634 acres and the North-side park system contains 318 acres. This is not inclusive of the small parks before mentioned as being under the administration of the city.

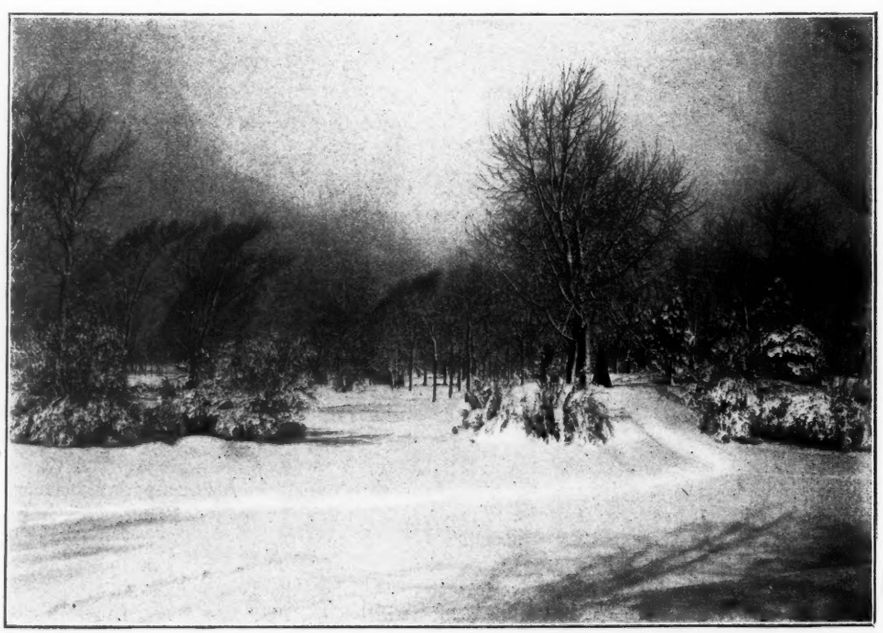
The South-side has six park areas of which Jackson park and the Midway (famous as the site of the Columbian Exposition) comprise 604 acres. Washington park, 371 acres. The new McKinley park 34 acres and there are some 211 acres for the new Lake Front Park, the greater part of which has yet to be made from land to be filled in Lake Michigan. The remaining acreage to complete the total is comprised in a small park and square. The population per acre to the South-side is 9.95 to the acre and the park area per capita is 85.82 square feet.

The West-side has fourteen parks, the most important being Humboldt park of 206 acres; Garfield park, 188 acres and Douglas park, 182 acres. The others average 5.33 acres. The population per acre for the West-side is 30.66 and the park area per capita is 40.60 square feet.

Wretched Conditions in Chicago

We now see that the park area, per capita, for the South-side is 85.82 (slightly less than that of New York) in comparison with 40.60 and 46.22 of the West and North divisions respectively. It is therefore evident that the park areas (insufficient as they are) are unequally distributed over the city. To make the West and North-side parks equal to those of the South, their areas should be doubled. The greater part of the South-side area of parks lies at a considerable distance from the heart of the city, and is at the present time practically the termination of its inhabited parts, whereas the West and North-side parks are situated in neighborhoods that are densely settled. It follows that the latter district should have outlying parks in their respective directions of at least as great an area in ratio to their population as that of the South. To obtain this result there would be required some 600 acres on the West-side and 350 on the North. Another 1,000 acres of park is required for Chicago to make it equal in ratio to New York. This is insufficient if regard is given to the extra advantages New York possesses as before stated. Chicago has, at present, a population of 743 to the acre and, as this number will rapidly increase, it would be wise to provide even greater park areas,—at least 2,500 acres of land should be obtained for additional parks.

Out of the thirty-five wards that constitute the city, there are nine that contain no park areas; these comprise over 20,000 acres and a



WINTER SCENE IN WASHINGTON PARK

population of more than 400,000. This means that about one-sixth of the city's area is devoid of open spaces for recreation and pleasure and one-quarter of the inhabitants of the city have to travel out of their wards to gain the benefit of such grounds. Lately there has been a movement in the direction of providing small parks in the densely settled parts of the poorer districts and the sites for three such places have been obtained. This is a step in the right direction, but it is apparent that it is altogether inadequate to supply the need.

MOST OF 22-MILE WATER FRONT INACCESSIBLE

Chicago has a water-front to Lake Michigan of twenty-two miles but the public has access to only about five miles of it. If every man, woman and child in the city stood shoulder to shoulder along this length, they would present a solid phalanx over one hundred deep. If the whole of the city's twenty-two miles of lake front was available it would take the whole of a day and night for the population to stand in one single row so that each could have a continuous and uninterrupted view of the water for one hour.

Lake Michigan is the one natural, dominant feature of Chicago's attractions, and advantage should be taken of it and the whole of its frontage through the city's limits should be secured in perpetuity for its citizens, and a continuous Lake-shore Drive should be made passing through Lincoln Park, the new Lake-front Park, and Jackson Park, all of which front on the lake. By making parkways along its length some 500 acres of the required park area could be added in locations where they would prove the greatest benefit, not only to the city but to its visitors.

"THE WOODED ISLAND," JACKSON PARK

On the North-shore of Lake Michigan, some six miles from the city's northern limits, the character of the land changes from the flatness surrounding Chicago, to high land, well wooded and intersected with ravines and, at some points, still further north a tract of 1,000 acres should be obtained for park purposes. The land is eminently suited for such use and could now be obtained at a comparatively low price.

West of the city, 500 acres of the land bordering the Desplains River could be utilized. This may seem an extravagant accession to the city's parks, but that it is not more than is needed is evidenced by the foregoing figures given in relation to other cities.

Northwest of the city there is land through which the north branch of the Chicago river flows, 500 acres of which could be well adapted for park purposes.

To correct an apparent error in the figures given for the respective areas of the South-side and city parks it should be stated that some ten acres of the land dedicated for the Lake-front Park are vested in the city. Of this, some five acres, called "Grant Park," have been improved this year by the writer, at the expense of private citizens who have temporarily formed a Board of Commissioners, for the small area at present under the city's administration, but as undoubtedly this part of the Lake-front Park will ultimately be merged into the South-park system, it is so estimated in their total area.

This munificence on the part of public-spirited citizens, who at their own charge have transformed the dreary expanse of a site for the dumping place for street sweepings into a cheerful park ground, is a matter for congratulation and this spirit in further city improvements may well be extended. The result would be more beneficial than the building of museums, libraries or colleges.

The Lake-front Park will, in the future, be called "Grant Park," and in that piece of land lying between the Illinois Central railway station at Twelfth street on the South and the Randolph street viaduct on the North, extending eastward from Michigan avenue to the inner breakwater in Lake Michigan. The process of filling-in the lake has been going on for years but at the present rate of progress it will be a long time before it is completed. Unfortunately this land is intersected by the Illinois Central railway, and, until it is covered in for the entire length of the park, it will continue to be a most objectionable feature to what should be the most useful of all Chicago's parks.

The city lacks the necessary open spaces in the crowded downtown districts. This park must supply the deficiency and it will give opportunity for those effects of civic dignity and stateliness in which Chicago is sadly lacking.

WHAT TREES TO PLANT IN CITY STREETS

THE proper distribution and selection of trees for streets was made the subject of a report by the committee of the Hartford (Conn.) Florists' Club. While the recommendations of the committee were intended for Hartford alone, some of the points brought out in its report are applicable to every other city in the country. In the first place the care of the trees should be placed in the hands of the city government, according to the committee, so that a uniform method of planting can be carried out, as well as in the care given to those already on the streets. The trees should be systematically spaced, a distance of forty to fifty feet being allowed between trees. Careful pruning should be undertaken by those in charge, all the dead wood being cleared out and the trees kept free from insects. The ideal location for a line of street trees is between the property line and the walk. If planted in this position they are out of the reach of horses, the roots are further removed from the gas that escapes from the street mains, and they have more opportunity of obtaining moisture than when under an asphalt or other impervious street paving.

Regarding the kind of trees that does well under city conditions, the committee favors the ailanthus, which seems capable of withstanding any possible conditions in a city, such as smoke, dry soil, etc., and they are also free from insects. Other trees similarly constituted are the cottonwood, white poplar, and some forms of willow; then come the European linden and the English elm, both of which are tougher in this respect than the American species. For the suburban and semi-urban portions of the city the best all-around trees is the American elm. Its advantages are high but not too dense shade, the ease with which wires can be passed through its branches without mutilating them, its rapidity of growth and its beautiful way of over-arching the street. It has the disadvantage, however, of putting out its leaves very late, shedding them continually after the middle of the summer, and its liability of attack by the elm tree beetle. The English elm can adapt itself much better to unfavorable city conditions, but has a greater attraction for the elm tree beetle than the American type. The committee recommends for the suburban parts of the city such trees as red, scarlet, black and pin oaks, horse chestnuts, hackberry, silver and red maples and black walnut. The committee warns against the rock maple for street planting, this being one of the first to succumb to city conditions. Its shade is too dense and it is difficult for wires to be passed through its branches without cutting a large hole through the foliage. The Norway maple has some of the objectionable features of the rock maple but stands city conditions better. Where the trees on an avenue do not reach above a certain size the committee recommends that the practice followed in some European cities be carried out; that is, to plant trees which will attain a large size if left to grow, but which are kept within bounds by very severe pruning.

THE MAINTENANCE OF ASPHALT STREETS*

New York's Chief Engineer Favors the Short Term Guaranty—Thinks Cities Should Take Advantage of Improving Conditions—Notable Methods of Brooklyn and Washington

By Nelson P. Lewis, M. Am. Soc. C. E.

THE author has the object of trying to eliminate the necessity of a contractor making a guess at the cost of maintaining a pavement which may be laid by him during the period for which such maintenance will be required. His object is certainly a commendable one, and the speaker believes he is moving in the right direction.

PROVISIONS OF MR. HAZLEHURST'S SPECIFICATIONS

Let us see just how his specifications work out. They provide that all repairs which may be ordered during the period of the contractor's guaranty will be paid for, if the area is less than twenty square yards at a price 20 per cent. greater than his original contract price, while for areas between twenty and fifty square yards the advance will be 15 per cent., and for areas over fifty square yards 10 per cent. over the contract price. He refers to contracts let in Mobile for 17,000 yards of pavement at $1.15 per square yard. The amount paid for repairs, therefore, will be $1.38 per square yard, if the area be less than twenty yards. If more than twenty yards, and less than fifty yards, $1.32¼; while for any repairs covering more than fifty yards, he will be paid $1.26½ per square yard.

Now, he assumes as a proper maintenance cost to the city for the first five-year period after the expiration of a five-year guaranty, or for the second five years of the life of the pavement, 3 cents per square yard per annum. Of the 17,000 square yards laid in Mobile—assuming that practically all the repairs are in areas of less than twenty square yards as well, in the speaker's opinion, be the case in a successful pavement—he would be expected to relay about 370 square yards annually during the first five years, or 2.2 per cent. of the total area each year. For the second five years, during which he is allowed 8 cents per square yard, he could relay just about 1,000 square yards, or 6 per cent. of the total area each year. Now, if he assumes that none of these repairs overlap each other, which is not probable, he would have renewed during these ten years, from the fifth to the fifteenth year, 41 per cent. of the original surface. Of course, there will be more or less overlapping; repairs will wear out and have to be renewed, and it is fair to assume that, say, one-fifth of the repairs made will have to be done a second time, so that the contractor will have replaced one-third of the total area of the pavement by the end of fifteen years.

DO WASHINGTON PRICES AFFORD A FAIR STANDARD

Has the author adopted a fair standard when he refers to the cost in the City of Washington? The speaker does not believe he has. Washington is not a logical city, to which one may look for such a standard, especially if it is to be applied to a small city which is just beginning to lay smooth pavements. The conditions in Washington are nearly ideal. The streets are extremely broad, the traffic of the city is comparatively light, and it is admirably distributed. In smaller cities, when smooth pavements are first laid, an abnormal amount of traffic is always attracted to them. This is invariably the case, and it is impossible to predict what will be the relative amount of traffic on new, smooth pavements. The character of a street will be radically changed within two or three years, possibly after it is paved. Even in a city having comparatively a large amount of smooth pavements, a remarkable transformation will take place in the vehicular traffic as new routes are laid out and new connections are established.

While the author may have given the contractor a good guessing basis, he is still going to make him guess. He is compelled to guess how much he will have to add to his construction price in addition to the 3 cents per square yard allowed for the second five-year period, and the 8 cents per square yard for the third five-year period, or, in other words, how much more than 40 per cent. of the original surface of the pavement will have to be renewed by the end of fifteen years, and he is going to guess liberally if he is a shrewd man. The contractor in Mobile evidently did not make a very liberal allowance, as his price was only $1.15 per square yard.

It is evident from the specifications which are quoted in the paper that if the contractor does not have to lay as much as was anticipated, that is, if he does not have to renew 2.2 per cent. annually for the first five years and 6 per cent. annually for the second five years, he is not to be paid for it.

RELATIVE VALUE OF LONG AND SHORT TERM GUARANTIES

Now, there has been a good deal of what the speaker will venture to call nonsense said and written about long-time guaranties, and short-time guaranties, and the reasons for one or the other.

In a report made to the Mayor of New York City by his Commissioners of Accounts in 1899, there was a table tending to show what the insurance cost of pavements had been; that is, what premium the city was paying for long-time guaranties, and in estimating that cost they allowed 2 cents a square yard annually for the maintenance of New York pavements, amounting to 30 cents per square yard for the entire fifteen years, which was the guaranty period in the contracts under discussion. If this sum were all charged to the ten years from the fifth to the fifteenth, it would amount to only 3 cents per square yard per annum, and it cannot be claimed seriously that New York pavements can be maintained for 3 cents per square yard between the fifth and fifteenth years. The table also includes the cost of a plant for fifteen years at 5 cents per square yard annually, and the last and largest item is interest lost on money retained for fifteen years at 6 per cent amounting to 64½ cents, showing that the total cost to the city for insuring its pavements for fifteen years is 99½ cents per square yard.

It is difficult to understand how it can be claimed seriously that the money retained under a paving contract, as it is in New York City, is wrongfully kept from the contractor, and that he should be allowed and will charge interest on it. It is not money which has been earned.

Mr. Whinery has referred to cases where 50 per cent. of the amount due the contractor has been held back that should have been paid to him on the completion of his work. It is probable that he did not refer to the New York City practice, but to cases where no bond is required.

The amount retained by the city of New York under the fifteen years' guaranty was 30 per cent. of the cost of the asphalt surface, of which 3 per cent. was paid each year, beginning at the end of the sixth year and up to the end of the fifteenth; that is, it was assumed that 3 per cent. of the cost of the pavement, which, at $2 a yard, would be 6 cents, or, at $3 a yard, 9 cents, was the amount which the contractor would probably earn in making those repairs, and this seems to the speaker a fair allowance. In the case of the ten-year guaranty, the amount retained was 20 per cent. of the cost of the wearing surface, of which 4 per cent. was paid at the end of each year from the sixth to the tenth. This allowance again would be, on the basis of $2 and $3 pavements, 8 or 12 cents per square yard. But that money was not earned; it was not due the contractor, and to charge it up as the price the city was paying for long-term guaranties was erroneous and misleading.

The speaker, however, agrees with the conclusions reached, and the contention that the long-term guaranty is unwise, but his reasons are entirely and radically different. It is probable that an asphalt-paving contractor, who is jealous of his reputation, will charge little, if any, less for a pavement without a guaranty than if he were guaran-

* This discussion (of the paper by James N. Hazlehurst, M. Am. Soc. C. E., printed in *Proceedings* for May, 1902), started in the February issue of the MUNICIPAL JOURNAL AND ENGINEER. It is concluded in this number by Mr. Nelson P. Lewis, Consulting Engineer to the Board of Estimate and Apportionment of New York, and was first published in the *Proceedings* of the American Society of Civil Engineers, Vol. XXVIII, No. 8, October, 1902, commencing on page 730, here republished by courtesy of the Editor of *Proceedings* of the American Society of Civil Engineers. (*Copyright, 1902, by the American Society of Civil Engineers.*)—[EDITOR.

teeing it for five years, assuming that he would exercise the same care in laying the one as the other.

CITIES SHOULD TAKE ADVANTAGE OF CHANGING CONDITIONS

Streets differ so much in the traffic they sustain, and, as already stated, the future of a street is so uncertain, that when one deals in futures of more than five years he certainly has to estimate liberally, and the contractor is obliged to guess, and guess liberally, how much he will have to spend from the fifth to the fifteenth year.

But conditions are changing in a large city like New York, and they are changing for the better, and account should be taken of the changes. Steel tires are wider than they were, a large proportion of them has been replaced by those of rubber, horse-shoes are lighter, and one will not discount the future properly if he does not take into account the large percentage of horseless, smooth-wheeled vehicles which will be found on our streets before a ten or a fifteen-year contract made at the present time will have expired. All of these changes will tend to simplify the problem of maintaining our asphalt pavements. The elements most injurious to them are constantly being eliminated.

Now, is it not the plain duty of the municipality to take advantage of these changed conditions instead of giving all that advantage to the contractor? It will be his if he is obliged to make a guess upon the cost of maintaining a pavement for fifteen years. He will base his guess upon his past experience with pavements now ten and fifteen years old, and it can scarcely be questioned that the conditions will be so different in another ten or fifteen years that the advantage will all be his.

The speaker would like to suggest what seems to him a logical method of dealing with this problem, and one which will eliminate it almost entirely. It is that, after the expiration of the original contract covering not more than five years, subsequent contracts for from one to five years be made for maintaining the pavements, which contracts should provide that the contractor be paid for the material actually used, and which would be placed where directed.

This system has been in vogue in the District of Columbia for some years, and with admirable results. It is doubtless true that the figures which the author uses, viz., 3 cents per square yard as the cost of maintenance for the second five-year period and 8 cents per square yard for the third five-year period, are due largely to the use of this method, although, if the speaker correctly reads the recent reports of the District of Columbia, the average cost from the fifth to the tenth year is below 3 cents, and from the tenth to the fifteenth year below 8 cents. It is probable that the 8-cent average is obtained by including, as the reports do, a number of streets which are entirely re-surfaced and which increase the apparent cost very materially.

This same method is now in use in the Borough of Brooklyn, the second contract made on this basis being now in force. Under these contracts the wearing surface is paid for by the cubic foot, measured in carts on the street. The first contract provided for a payment of 97 cents per cubic foot for the wearing surface; the present price is 90 cents a cubic foot, while, with the burner method, or the skimming process, the price under the old contract was $1.15 per cubic foot; under the present one this method of repair is not provided for at all, it being considered unsatisfactory and to be discouraged, while the price for binder was, under the first contract, 35 cents a cubic foot, and under the present one 50 cents.

ADVANTAGES OF BROOKLYN AND WASHINGTON METHODS

A great element of saving under such a contract is in repairs to streets, which, from their age or traffic, have been reduced in thickness. Many streets, doubtless, will be found in which the wearing surface, instead of being two inches, is one and one-quarter inches, and in some instances less. Formerly, when repairs were paid for by the square yard, as is provided for under the plan proposed by the author, the city would pay for a standard pavement two inches in thickness, and with one inch of binder, when it gets considerably less. But, by the cubic-foot method, the same amount will lay a proportionately greater area, and while the amount expended under the Brooklyn contract was perhaps as much as under the old method, still the repairs were put where they did the most good. It enables one also, in the case of extremely bad pavements which need re-surfacing, to repair only the dangerous places and keep them in safe condition for a year or so, until they can be re-surfaced, without spending a large sum.

As already stated, the conditions in Washington are exceptionally favorable, but recent reports from Rochester would indicate that the repairs to its asphalt pavements cost even less than in Washington. The record, as given in the report of the City Engineer for 1900, is quite remarkable. The average cost for all streets is not given, but taking a pavement which was laid in 1886: From 1896 to 1900 the cost of maintenance per square yard per annum was 1.2 cents; another one cost 6.6 cents, and the next one 4 cents. These are the averages from the tenth to the fourteenth year. The next one is 2.8 cents, and one, on which the guaranty expired in 1892, appears to have been maintained since that date at an average cost of less than 1 cent per square yard. This is an admirable showing, and, judging from the limited opportunities the speaker has had to observe the Rochester streets, it is not because the repairs have been made spasmodically and only when necessary, because the streets have been kept in excellent condition. The City Engineer also states that in making the figures the area between railroad tracks and two feet outside was excluded from the area of pavements maintained and in the cost, as these spaces are cared for by the surface railroad companies.

In reply to the question as to the reason for the cracking of asphalt pavements subjected to little or no traffic, the speaker believes that such pavements do have a tendency to crack more than those which are subjected to moderately heavy traffic; the reason, undoubtedly, is that in unused or little used pavements the wearing surface is not kept thoroughly compressed, and is therefore much less dense, and the action of the elements on the bitumen, the function of which is to hold the mineral matter together, is quite marked. Traffic does keep the surface more dense, and therefore more impervious to water, and better protected against the action of frosts

THE END

MUNICIPAL RESTRICTIONS ON TELEPHONES IN IOWA

ACCORDING to the code of Iowa, cities and towns have the power to regulate telephone wires and poles and to provide the manner in which, and the places where, the same shall be located on streets, roads and public places. No franchise can be granted, renewed or extended by any city or town unless the vote of a majority of the legal electors favor the same at a general or special election. The council may order such elections or the mayor may submit the questions to vote on petition of twenty-five property owners in each ward of a city or fifty such persons in an incorporated town. The party applying for the franchise, its renewal or extension, must pay the cost.

Any town or city may elect park commissioners who, with the advice of the city engineer, shall superintend the setting of poles and stretching of wires according to the ordinance of such city.

Any person or corporation within or without the State may build a telephone line along the public roads or over any public or private lands.

The one in charge of any telephone line within the State must furnish equal facilities to all the public and to connecting lines and must transmit messages without unreasonable delay. Any mistakes in transmitting or receiving messages or any unreasonable delays in their transmission or delivery renders the owner of such line liable for damages to the injured party. In actions for damages of this character, negligence on the part of the telephone company is presumed and the burden of proof rests with it.

Stock of telephone companies is not taxed. Taxes on the plants are determined by the executive council, composed of the governor and other State officials and are based upon the actual value of the property.

GOOD ROADS MOVEMENT IN NEW JERSEY

Commissioner Budd Makes a Fine Showing for 1902—Popularity of the Movement Increasing—Greater Things Planned for 1903

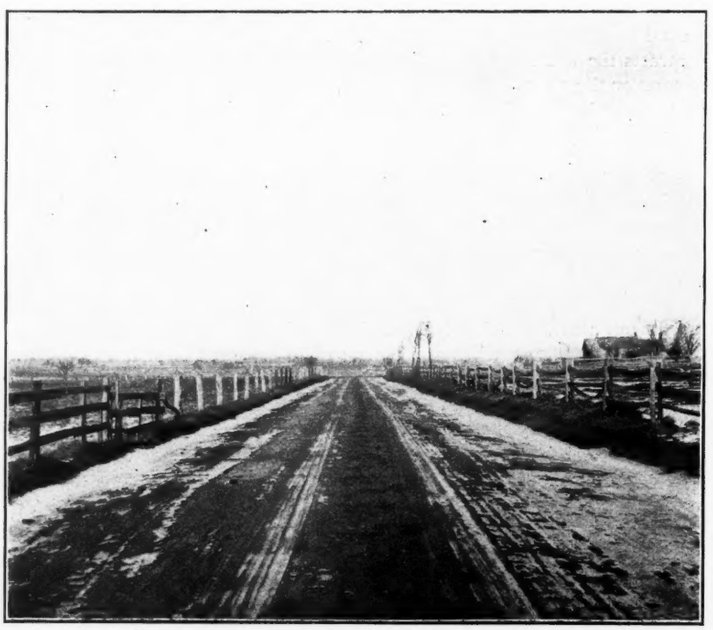
THE demand for improved highways in the State of New Jersey has been greater during 1902 than ever before. The benefits to be derived from good, level roads are being realized by the dwellers in the country and the counties of the State are taking advantage of the provisions of the State Aid law which permits each county to spend an amount for improving its roads equal to one-fourth of one per cent. of the ratable property of such county for the last preceding year. The figures in the report of State Engineer Henry I. Budd for 1902, show how the number of miles of good roads has grown since the passage of the law in 1893. In 1893 and 1894 four counties built a total of 74.84 miles of road. In 1899 the number of counties building under the State law had risen to thirteen and the number of miles to 114.72. During the last year seventeen counties built their quota of roads with a total mileage of 155.305. As there are only twenty-one counties in the State it will be seen that a large majority of the counties aided in the improvement of the roads. Some of the counties have already improved nearly all their main roads, and so do not need to spend the amount that is necessary to bring the highways of other counties up to their standard. Since the passage of the State Aid law 706.791 miles of road have been built by nineteen counties and the total amount expended on this work amounts to $1,265,168.55. Burlington county is in the lead, in mileage, having built two-fifths more miles than the next lowest county. Provided the State appropriation is liberal enough to meet the amount that can be expended by each county, according to the percentage allowed, it is estimated that within a few years all the leading roads could be covered with gravel and stone. At the present time the total amount of work petitioned for, in all the counties, amounts to 550.72 miles, at an estimated cost of $2,404,851.

To tell of all the roads that have been improved during the past year would take many pages and prove monotonous, but to illustrate what has been done it will suffice to give the details of the roads illustrated by the accompanying cuts. The ridge road in Essex county is built of telford, five inches in thickness, and of macadam three inches thick, and is sixteen feet wide. It forms a connecting link between the roads of Essex and Passaic counties. It traverses the ridge, back of the town of Montclair, passing the large reservoir now being built for the city of Newark. As in many other roads in the State the grade in parts of the road was 9.59 per cent. and much too heavy for profitable haulage of farm or other products. The improved road has a maximum grade of 5.1 per cent. The total cost of the road was $13,857.42, and the cost per square yard for eight-inch telford, was placed at 54 cents. The length of the portion of this road improved is 2.04 miles.

As contrasted with the above road, in the hilly section, is the Conover Corner road, in Somerset county. This one was built of rock, six inches thick and macadam four inches thick, and is twelve feet wide. It will form part of the chain of roads joining the most northerly point in New Jersey with the State Capitol. At present it permits of easy access for the farmers of the county to their county seat. The maximum grade of this road was heavy, being 9½ per cent., but in improving the road was graded down to 6 per cent. in the steepest part. The length of the improved road is 3.38 miles and the cost was $19,858.86, the State's share being $6,619.62.

The last Legislature of the State increased the appropriation from $150,000 to $250,000 and the counties promptly met this increased amount with their own appropriations. The numerous petitions for roads, however, greatly exceeded even this large amount. According to Mr. Budd work on many roads has been much delayed for two reasons: In many counties the freeholders consider they have no authority to advertise for bids until after they make their appropriation at the annual meeting in May. This delays the commencing of road building, and, by the time the surveys, advertising, consideration of bids, etc., is completed, little time remains for the actual building before the cold weather sets in. For of the best road-building

ROAD IN SOMERSET COUNTY BEFORE IMPROVEMENT



SOMERSET COUNTY ROAD AFTER IMPROVEMENT

months in the year, March, April, May and June are lost and the work has to be done in months when the teams and men are engaged in the harvest fields. The law, therefore, should be amended so that freeholders can make appropriations at any time after the first of November preceding their annual meeting. All the preliminaries could be completed during the winter months and the work started as soon as the spring arrives.

Another reason for delay in building last year was the excessive rain-fall, which lasted for a long period and put off building for many days. Then the work in the fields made labor scarce, the coal strike made it difficult for coal to be obtained to operate the stone crushers and the great demand for teams in harvesting took them away from the work of road-building.

During the years that the State Aid law has been in effect, the experience gained in working under its provisions has indicated several places in it that should be improved. In several instances the authorities in different counties interpreted the law various ways, thus causing confusion and preventing uniformity in action. To obviate this trouble, some amendments have been suggested as follows:

The freeholders should have the authority to immediately take possession of land needed to widen a roadbed or to alter the original courses where badly laid out in the beginning. Many of the roads not yet improved have been found to be entirely too narrow to properly grade. Experience has shown that no road should be less than fiifty feet wide. In some counties many roads are not over two rods in width, in many instances the fences having been gradually moved over onto the road and, as there is no record of the proper width as first laid out, the property owners claim the land to line of their fences. In the hilly sections it has been found too expensive to grade the roads in their original location and the macadam does not add to the value of the road unless the grade is decreased. As at present situated, the grade on some roads is much too heavy for the drawing of anything but very light loads and so it is useless to macadamize the portions of the road on lighter grade unless a team can draw a heavy load over the entire length of the road. In the northern parts of the State many of the roads are laid out directly over hills, when a slight detour around them would greatly reduce the grade and not materially increase the distance. It is in such cases that the relocation of roads is necessary before improvement, but the objection of a few property owners will prevent the relaying of the road. On this account the freeholders should have the power to take possession of land at once and, when an agreement cannot be reached with the abutting owners, allow all damage proceedings to take place afterwards. Many thousand dollars would be saved the State in the opinion of Mr. Budd, for large sums have been spent in reducing the grades of hills when the same or less sums would have paid for property in relocating the road with the additional advantage of a permanent level road.

RIDGE ROAD BEFORE IMPROVEMENT

RIDGE ROAD AFTER IMPROVEMENT

The desire of some of the counties to improve their roads more rapidly than the present law permits has become so great that the tax of one-fourth of one per cent. upon the ratables is not sufficient. On this account it is considered a wise plan to permit the freeholders to form contracts for at least one-half of one per cent. If, at any time this becomes too burdensome, they should be allowed to issue low rate bonds to meet the needs of the work. It is claimed that those who build the roads should also have the enjoyment of them. They are permanent improvements and it is only right that, as the succeeding generations are to benefit by them, they should pay their share towards their construction. Thus the issuing of long term bonds at low rates of interest would carry the cost of road-building over many years and take away from the present generation some of the burden of the cost of construction. Many of the counties have asked that the present law be amended so that the first payment on the bonds would not have to be made until the first six years have expired. By this arrangement they could borrow more advantageously as investors would allow a lower interest rate if the payment on the principal did not begin for several years. Power should also be granted to the counties to assume, under certain conditions, the payment of ten per cent. for the peculiar benefits conferred. Where the improvements are generally spread out, it is not right to collect the ten per cent. both on account of the cost of collection and because all parts of the county partake of the benefits, it is not right that the abuttors should pay more than those who use the roads as much as they.

The Commissioner of the State should have the power to appoint as supervisors such persons as were possessed of the necessary qualifications instead of being compelled to select those petitioned for. The work would be benefited and money saved if competent men were always placed in charge of road building. The Commissioner should also have the power to mandamus the freeholders when they neglect to repair the roads under State aid.

BRICK PAVEMENTS IN TORONTO

More Than Thirty-six Miles of Brick Track and Street Pavement—Well Adapted to This Northern Climate—Valuable Pointers About Construction

By Charles W. Dill *

THE first use of brick for paving purposes in Toronto was in the year 1893, when practically four miles of street railway track allowance was paved with brick on concrete. The brick for this work was supplied by the E. B. Morse Company, the Coleman Hamilton Company and the Massillon Brick Company, all of Ohio. These pavements have been subjected to a great deal of hard traffic, owing to the street pavements being rough, worn-out cedar block pavements, the whole traffic using the paved track allowance. Their

ONE OF TORONTO'S BRICK STREETS

condition to-day shows that the bricks were of good quality. Owing to the undue wear at the rails, caused by vehicle traffic using the

BRICK PAVEMENTS WEAR WELL

tracks on unpaved streets, a single row of scoria blocks was placed on the inner side of each rail which proved so satisfactory that the practice has been continued until the present time, except that granite setts have practically replaced the scoria blocks. Since 1893, approximately 24.7 miles of street railway track allowance have been paved with brick, as it has been found that brick is the most satisfactory material for this purpose, chiefly owing to the facts that the vibration caused by the cars has no effect in disintegrating the pavement, as is the case when asphalt or concrete is used, and also the ease and cheapness of replacing when the necessary openings are made for the purpose of renewing rails, rebonding joints, etc.

The first brick pavement constructed in Toronto was in 1895, when two short streets were paved with brick on concrete.

At that time, owing to the high price of brick and cement, it was felt that the price was too great for any extended use of paving brick and in 1896, an experiment was tried in which the bricks were laid on a gravel foundation. The result seemed to justify a continuance of the experiment and up to 1900, a number of streets were paved with brick on gravel and broken stone foundations. At this time it became evident that such foundations were not permanent, the condition of the streets so paved showing the difficulty of securing a gravel or broken stone foundation of uniform firmness, the result being bad cracks and settlements on the streets. Since 1900, only concrete foundations have been used and there seems to be no desire to return to the cheaper foundation. Since 1895, practically 11.6 miles of streets have been paved with brick on concrete foundation and 3.3 miles on gravel, or broken stone foundation.

The difficulty of getting a smooth, even, moderately noiseless pavement with the local brick and the small difference in cost between brick and light asphalt prevents a more general use of brick for street paving purposes.

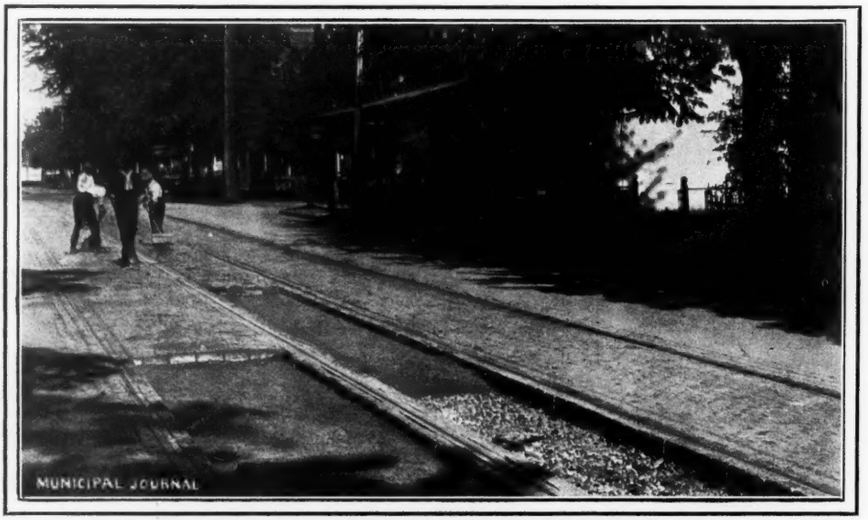
From 1893 to 1895, the brick used was imported from the United States and was principally supplied by the Standard Shale Brick Exchange of Canton, Ohio. In 1895, a local company commenced the manufacture of paving brick and later, a second company, and the brick used since then has been practically all of local manufacture.

METHODS OF TRACK CONSTRUCTION

The method of construction used in our track allowance work is much the same as that in general use, among other Canadian cities. We are particular about the foundation and, for this reason, under each rail the concrete is two inches thicker for a width of twenty inches.

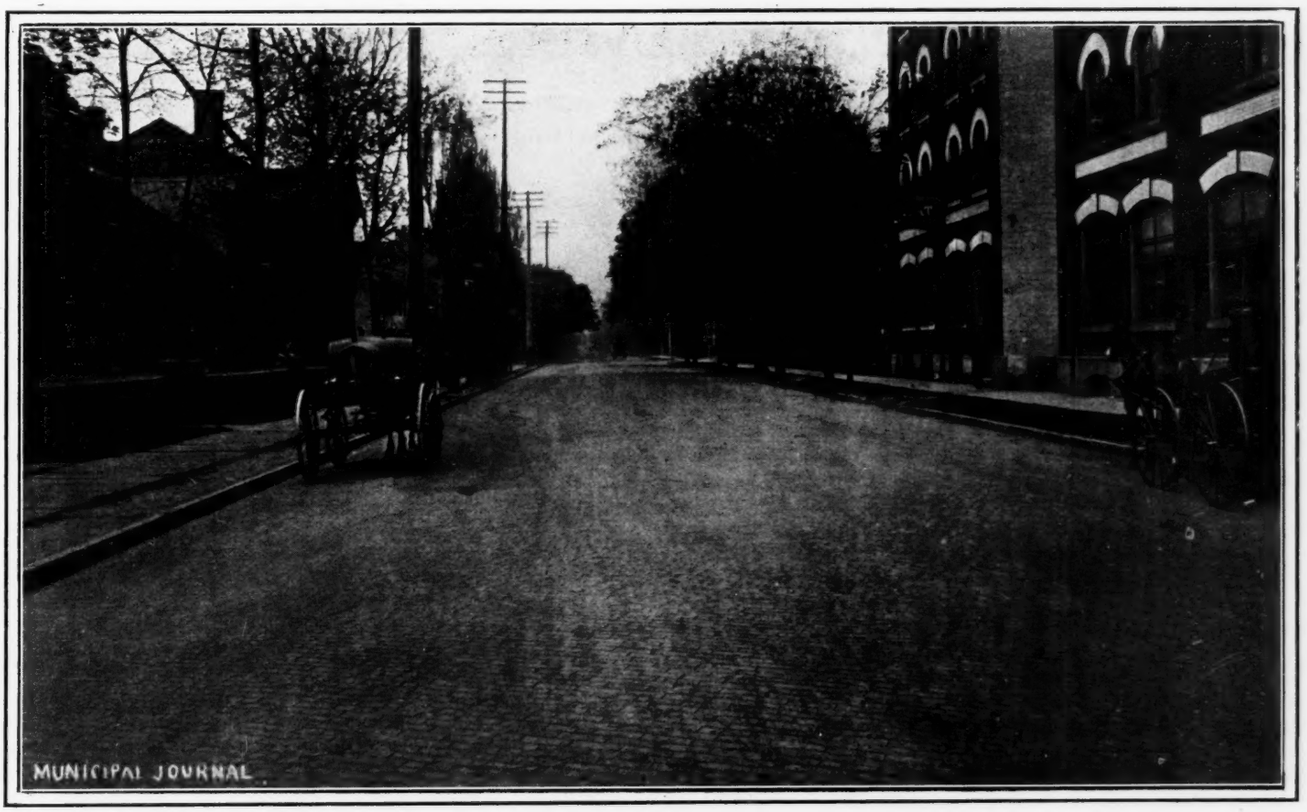
This concrete is composed as follows: One part approved Portland cement; three parts clean, sharp sand, and seven parts of clean, screened, broken stone, no particle of which shall exceed two inches in length or breadth, nor be less than three-fourths of an inch in length or breadth.

The grooved girder rails used are six and one-half inches deep, which necessitates using a sand cushion a little thicker than is usual, but with proper care exercised in laying we have had no settlements to cause undue roughness on the finished surface. The devil-strip is crowned one-half inch above the rail and the track portions are crowned three-fourths of an inch above the rail. The special construction prevents the use of a roller for compacting the pavement so that ramming has to be relied upon entirely for this purpose. The grouting is done in three successive operations. The first coat of filling consists of one part of approved Portland cement to two parts of approved, clean, sharp sand. This coat is supposed to fill not more than half the depth of the joints. The second coat of filling is a thicker grout consisting of two parts of approved Portland cement to one part of approved sand and is supposed to fill the upper



BRICK CONSTRUCTION AROUND STREET CAR TRACKS, TORONTO

* Roadways Engineer, City Engineer's Department, Toronto, Canada.



BRICK PAVEMENT, TORONTO, LAID DIAGONALLY TO CURB

half of the joints. The third operation is a repetition of the second to ensure that the joints are completely filled, after which a layer of sand not greater than one-half inch in depth is spread over the finished work and the section of the pavement kept closed against the use of the public for from five to seven days.

The soil in Toronto is principally a sandy loam which does not require the use of a tile drain under the curb, except in special cases, and a tile is simply built into the wall of the street gulleys to drain any surplus water accumulating in the gravel filling of the curb trench.

The sub-grade is thoroughly rolled with a five-ton horse roller as we find the steam roller has a tendency to bury itself in the sandy soil and waves the sub-grade to a certain extent.

The concrete for the foundation consists of the same proportions as for the track allowance foundation and when laid is thoroughly rammed with square, wooden rammers and the finished surface is made to conform to the lines and levels shown on the drawings.

The sand cushion is of such thickness that, when the bricks have been thoroughly rammed and rolled, it shall be one and one-half inch thick.

Prior to 1898, the bricks were laid in parallel courses at right angles to the curb with three or four rows of brick laid next the curb as stretchers. Then a change was made, leaving the three of our rows next the curb as stretchers and laying the balance in parallel courses diagonally with the curb. The reasons given for making this change being less noise, increased bearing surface on each brick along the line of travel and consequently less wear. After a fair trial we have decided to abandon the method of laying the brick diagonally with the curb for the following reasons, in favor of laying at right angles to curbs: (1) Saving in cost both in labor and waste of material; (2) better foothold for horses in slippery weather; (3) no appreciable increase in noise from vehicular traffic or in wear. We have also done away with the three or four rows of brick laid next the curb as stretchers as that construction proved to be a detriment rather than an advantage to the life of the pavement. The use of the one inch paving pitch at the curbs was adopted in 1900, and we consider it of vital importance to the success of our brick pavements.

Brick Pavement Well Adapted to This Northern Climate

Brick makes a very satisfactory pavement in our northern climate and would be much more popular if it were less noisy and could be laid at a less cost. The average cost during the past year for brick pavement on 4-inch concrete foundation was $1.85 per square yard; on 6-inch concrete foudation, was $2.20 per square yard. The contract prices for No. 1 pavers for the year was $15.00 per thousand, delivered on the work. The contract price for Portland cement was $1.75 per barrel (in sacks) f. o. b. cars Toronto; for sand, 77½ cents and 85 cents per cubic yard, delivered on work; broken stone, $1.50 per cubic yard f. o. b. cars Toronto, or an average of about $1.80 on the work. We pay unskilled labor 20 cents an hour; pavers get 30 cents an hour, and foremen are paid $3.50 per day. Stone curbing is used entirely on our brick pavements and 4-inch curb costs us 38 cents per lineal foot f. o. b. cars Toronto.

VENTILATION OF SEWERS AND DRAINS*

Practice in English Cities—How Some of the Difficulties Are Overcome—Hints for American Sanitarians and City Engineers

By R. Read

THIS subject has been a fruitful source of controversy for the last twenty-five years, but it has rarely been discussed under more favorable conditions than the present. Usually the papers on this subject are crowded in amongst a number of others, or they are discussed by people who have no real knowledge of it; but here we have a gathering of gentlemen, each one of whom has a system of actual live sewers, in daily operation, under his charge; and it is only those who have studied the working of a system of sewers for at least twelve months, so as to observe them under all conditions of weather, and season, who are capable of forming a correct judgment on the matter. And even to such a gathering the author would appeal—as a counsel for the defence would appeal to the jury—to dismiss all prejudice and preconceived assumptions from their minds in regard to the subject in order to deal with it upon its actual merits.

THE NECESSITY FOR SEWER VENTILATION

Let us consider then what is the action of a system of sewers and drains, and why it is necessary to ventilate them.

A system of sewers consists of a number of branches, converging into main trunk sewers, which again converge into an outfall sewer; about nine-tenths of the whole would probably be pipe sewers, ranging from 9 in. to 18 in. diameter, and the remaining one-tenth would probably be brick sewers. The upper ends or branches will probably have the steepest gradients, the main trunk sewers somewhat flatter, and the outfall sewer the flattest gradient of all. House drains and street gullies will be connected at every few yards along the whole of their length, so that a system of sewers is a system of perforated pipes having varying gradients converging to a common outfall. The discharges from the house drains are intermittent, but as their aggregate length is about five times that of the sewers their numbers enable them to create a continuous current through the sewers, except possibly at the extreme upper ends of the branch sewers, for a distance of from 50 to 100 yards from the summit, where the drains may not be sufficiently numerous to produce a continuous current in that length of the sewers. If a system of sewers is to be self-cleaning it must be so proportioned and graded that the flow of sewage has a minimum velocity of 3 feet per second, or about two miles per hour, which is sufficient to discharge the sewage at the outfall from the majority of towns in two or three hours. If in some cases the gradients are not sufficient to give that minimum velocity, special methods of flushing must be resorted to, in dry weather, to keep the sewers free from deposit. If deposit occurs in a sewer it arises from one of the following causes:

CAUSE OF SEWER DEPOSIT

(1) Flat gradients. (2) Insufficient flushing either at the w.c.'s or in the sewers themselves, the w.c.'s being the proper initial point of flushing, as from this point it traverses both drains and sewers. (3) Inefficient, or neglected, street gullies and manhole buckets; and (4) What sometimes happens in a new district, is insufficient live drain connections—that is to say, the sewer will be laid in the street of sufficient size for future requirements, but there may be only a half dozen houses built and occupied for several years; the result is that, however well the sewer is graded or constructed, the sewage from this small number of houses is lost in it, the water running away and leaving the solids stranded behind it, to be shifted on a further stage by the next discharge from the house drains.

If a deposit occurs in any sewer from bad design or bad construction, this can only be remedied by reconstruction on better lines and levels; but ventilation has often been blamed for calling attention to this requirement.

All the causes of deposit mentioned above are more or less preventable, and if there is no deposit in a well-designed and constructed sewer, why is ventilation necessary?

The dry-weather flow of sewage through a system of sewers gradually increases and decreases in quantity; that is to say, from a minimum at about 3 a. m., it gradually increases to a maximum about 3 p. m., remains near the maximum until about 7 p. m., when it will begin to decrease until it reaches the minimum again at 3 a. m. This, of course, means that a large amount of air must be displaced from the sewer while the sewage is increasing in volume, and a corresponding amount of air taken into the sewer as the sewage decreases. The air which is displaced by the sewage must go somewhere, either up the house drains or through any manholes or ventilators which may have been provided.

Complaints of nuisance from sewers are generally confined to the six months of the year between the end of March and the end of September, and more especially occur after a few days' or a week's dry weather; then the ventilation is generally blamed by the public as the cause of the trouble. Ventilation is necessary to provide for the escape of the air displaced by the rising sewage, or the air would be under compression and would force any traps which might be inserted for keeping it in the sewers; and the longer the time required to sufficiently compress the air to force the traps, the worse would be the final result.

METHODS NOW IN USE

The methods of ventilation now in use may be classified as follows: (1) Openings in the manhole and lamphole covers, at the street surface, at various intervals ranging from 40 yards upwards, but usually about 60 yards to 100 yards apart, the openings varying from 36 square inches per manhole upwards. (2) Vertical shafts attached to buildings, trees, telegraph poles, or self-supporting, 4 in., 6 in., and 9 in. diameter. (3) Various combinations of surface gratings and ventilating-shafts, generally in wrong proportions and positions, owing to legal difficulties. (4) Connections to factory chimneys. (5) Various patent systems of induced current ventilation by means of gas jets, water jets, or compressed air. (6) Systems of deodorizing the gases given off at the manholes by the introduction of chemicals.

The first system discharges sewer air or gas immediately under the noses of the people, and is uncertain in its action.

The second is an improvement on the first, inasmuch as it discharges the sewer air at a point varying from 20 feet to 60 feet above the street level, where it is not so noticeable, and has the advantage of being exposed to any wind which may be blowing.

The third system a combination of surface grids and vertical shafts, has seldom had a thorough trial in the proper proportions and arrangement which are necessary to harmonize with the action of the sewers, and thus convert it from a haphazard into a scientific and reliable system.

The remaining systems are altogether too costly for general application, although they are occasionally useful for isolated cases of offensive manholes, to avoid the expense of a reconstruction of sewers.

Let us now consider what happens to the sewer air in a well-constructed system of sewers and drains, with the sewerage flowing at the minimum rate of 3 feet per second.

In the summer time the temperature of the flowing sewage would range between 50 degrees and 52 degrees Fah., and the sewer air over the flowing sewage would range between 52 degrees and 55 degrees Fah. in twenty-four hours, while the outer air at the ground level during the same period may range from 50 degrees Fah. up to 75 degrees Fah. or 80 degrees Fah.; and speaking generally, during the summer months the sewage and sewer air are at a lower temperature than

* A paper read before the recent winter meeting of the English Association of Municipal and County Engineers, at Birmingham, which was entirely devoted to the question of sewer ventilation. Mr. Read, the author, is the City Surveyor of Gloucester, England.

the outer air, while during the winter months the reverse will probably be the case; but although this is true as a general rule, there are times during possibly each twenty-four hours in which the relative temperatures overlap each other. This is especially the case at sunset in the summer time, when the radiation from the surface of the earth reduces the temperature of the air in contact with it at the ground level to the same or a lower temperature than that of the sewer air. The result is that in cases where the sewer is ventilated only by gratings at the street surface, an escape of sewer gas occurs, generally just about dusk in the evening. But after a few days of dry weather the outer air has a low percentage of humidity, and the longer the drought continues the greater is the capacity of the outer air for absorbing moisture. The result is that any wet surface, such as the surface of the flowing sewage, and which is generally the only wet surface available, gives off watery vapor freely. This watery vapor is charged with organic matter from the sewage, and having about half the density of dry air, at the same temperature, it naturally rises from the manholes into the open air and thus causes a nuisance. This continues with increasing offensiveness as long as the dry weather lasts, and usually the break up of the dry weather is preceded by a fall of the barometric pressure, which again releases a further quantity of watery vapor, charged with organic matter from the sewage, and the nuisance is at its maximum, because the sewage is in its most concentrated form, the sewer air at its maximum quantity, and the outer air at its greatest capacity for absorbing moisture. It is this watery vapor under these conditions that the ventilation has to deal with, and which cannot be dealt with by any other means, although flushing may be a temporary remedy; but even if the Borough Surveyor doubles his daily consumption of water for this purpose, it would be a mere flea-bite compared to a good shower of rain. The municipal sewer-flushing can only touch the sewers, and has no effect on the house drains, which can only be flushed from the water-closets, the sink, and the bath wastes.

Some Reasons for Sewage Putrefaction

If the sewers discharge the sewage to the outfall at the minimum rate of 3 feet per second, it should arrive there long before it has time to set up putrefaction; therefore the watery vapor rising from the sewage should not be putrid, but it generally is so for three reasons, viz.:

(1) The alternate wetting and drying of the sides of the sewer, owing to the rise and fall of the sewage.

(2) The discharges from the house drains are more or less decomposed, owing to the interposition of the intercepting trap, which acts as a cesspool; and

(3) For want of proper ventilation.

In the absence of any deflecting influence, vapor rising from any wet surface rises perfectly vertical, but being of so light a character, it is easily deflected in any direction, and watery vapor rising from the surface of sewage in a sewer would naturally rise vertically against the crown of the sewer, and would roll slowly along the top of the sewer in an upward direction; but the motion is exceedingly feeble, and therefore the motion of the sewage flowing at the rate of 3 feet per second is a comparatively powerful force, which easily carries the watery vapor with it down the sewer, by friction of the two surfaces of water and air in contact; and the friction of the air and vapor against the crown of the sewer acts as a brake, retarding, but not preventing, the flow of air and vapor in the same direction as the sewage. The vapor following the flow of the sewage naturally eddies up each drain opening which it comes to, and also expands into the manhole chambers, so that the velocity never increases to the same rate as that of the sewage; but at the upper ends of the branch sewers, where the flow in the sewer for the first 50 or 100 yards is as intermittent as that of the house drains, the sewage has not the same power over the vapor, and its natural tendency to rise vertically may be sufficiently strong to carry it out at the top manhole grating, from that short length only, and thus gives rise to the popular error that the sewer air from the whole system of sewers rises towards the upper manholes of the system. This action can easily be proved by forcing smoke from an Eclipse machine into a manhole, say, in the middle or at two-thirds from the lower end of a street sewer, with the smoke nozzle in the sewer, pointing up the gradient, and it will be found that the smoke will appear in succession at all the manholes below this until the sewer is full of smoke, when it will also come out of the manholes above the point of entrance.

Any system of ventilation, to be efficient, must coincide with these actions of the sewage and sewer air; each length of sewer between a pair of manholes must have its own system of ventilation, the inlet being at the upper end of the length, at the street level, and be kept as small as practicable, and the outlets distributed at even distances over the length below to the next manhole, and be as numerous as possible. This can only be done by abolishing the interceptor, and making the ventilating shafts on every house drain assist in ventilating its own length of sewer between the nearest manhole on either side of it. In this way a large number of ventilating shafts above the houses are brought to bear upon the one inlet at the upper end of the, say, 100 yards length of sewer, and therefore the air enters at this inlet with a velocity greater in proportion to the difference between the area of its opening and the aggregate of the number of shafts between it and the next manhole below, and the greater the excess of the shaft outlets over the manhole inlets the stronger will be the velocity at the inlet and the less liable will it be to be reversed.

If there is any wind, however slight, or from whatever direction it is blowing over the tops of the outlet shafts, provided that it is not artificially deflected, this will only increase the velocity at the inlet. This proposal has always been met by the statement that you are passing the sewer gas through the house drains, and thus endangering the health of the inhabitants of the houses; and it was to try and prevent this that the intercepting trap was adopted, without investigation of any kind, into the Model By-Laws in 1877, because the doctors said that "sewer gas must be cut off from the houses." As an abstract proposition this requirement is perfectly correct, but the method of carrying it out by means of the intercepting traps is both absurd and dangerous. The trap is no protection to the house whatever, the real safeguard being the soundness of the drains. If the drain is sound the trap is absolutely useless, and a dangerous obstruction; and if the drain is not sound, the trap is also useless, because the emanations from the drain itself, and from the stagnant sewage in the trap, are quite sufficient to poison the whole household without any aid from the sewer. Intercepting traps, in their most approved form, hold about two gallons of stagnant sewage; they cause a retention of from 25 per cent. to 30 per cent. of the solid matter in the trap; they paralyze the flow through the whole length of the house drain, and cause it to become coated with putrid sewage throughout; and they absolutely prevent proper ventilation of the sewers. They are liable to be forced from the sewer side by the compression of the sewer air against them by the rising sewage; they necessitate a brick chamber and a so-called fresh air inlet, which has by force of circumstances to be placed within a very few feet of the front door, or front window, of the house, and every time the drain is used, the mica flap-valve, in connection with this fresh air inlet is violently closed, and if the valve is not very soon broken by this violent flapping action the compression of the air in front of each discharge from the water-closet against the sewage in the intercepting trap partially untraps it. The drain air then passes on into the sewer, and the sewage dribbles slowly into the inlet side of the trap, and slowly out of the outlet side, in the feeblest possible manner, into the sewer charged with putrefied organic matter, which the sewer ventilation, in whatever form it may exist, has to deal with, and gets the blame for. Equilibrium is restored by the sewage filling up the trap, and the process is repeated by the next user of the drain; but in the majority of cases the flap-valve at the fresh air inlet is either not air-tight, or is broken, and if the intercepting trap escapes being forced, owing to this defect in the fresh air valve, a strong puff of drain air is discharged under the windows or by the front door of the house during every use of the drain. The usual result of this is that the householder promptly stops up the fresh air inlet altogether, and then the last state of the intercepting trap and drain is worse than the first. And besides all this, the intercepting trap is liable to partial stoppages by an excess of paper, or a dish cloth, or any solid matter being put down the drain; then the sewage rises in the intercepting chamber and drain, until it has obtained sufficient head to force the obstruction, and some 30 square feet of brick surface is fouled with sewage. But occasionally the head in the chamber is not sufficient to force the obstruction, and then the builder, or the inspector of

nuisances, or both, have to be called in, the obstruction is pushed down to the bend in the sewer junction, and a message sent to the surveyor that the sewer is blocked, although the neighboring drains are still running.

In the majority of towns now all drain joints are made in cement, and the drains thoroughly tested before being allowed to be covered up, or used, and strict regulations are made as to the fall, usually not less than 1 in 48 or ½ inch to a pipe being specified, and any inspector on testing the pipes, and finding one with a back fall, or merely level without any fall at all, would immediately condemn the drain and have it pulled out and re-laid. But the same inspector, under the Model By-laws, is compelled to introduce into the lower end of the flattest part of the drain an intercepting trap, which causes an obstruction from 6 inches to 8 inches deep, full of stagnant sewage; and the believers in this trap assert that they are thereby saving the lives of the inhabitants of the house by cutting off the sewer gas, a statement which is altogether erroneous, as the trap is simply a manufactory of sewer gas on every house drain, pouring sewer gas into the sewer, which any system of ventilation of the sewers is blamed for, and is powerless to deal with, or prevent.

The patentees of a certain chemical process contend that owing to the temperature of the sewer air being generally cooler during the summer than the outer air, it is impossible for it to rise out of the sewer during the summer months, especially if charged with the heavier gases of decomposition, and that it accumulates during these months, to be discharged during the autumn or winter, when the sewer air is generally warmer than the outer air; and in this way they account for epidemics such as typhoid and diphtheria occurring in the autumn. But this statement about the differences of temperature during the summer and winter months is only partially correct, as has been shown in an earlier part of this paper. There are times during the twenty-four hours, more especially about sunset, when the temperatures overlap each other, and thus bring the sewer air out into the outer air; and there is also the difference in density of the watery vapor, as compared with the outer air, constantly acting in dry weather, as well as the fall of the barometric pressure, causing discharges of sewer air into the outer air, quite independently of the relative temperatures.

In conclusion, the author would like to try an experiment, by omitting the interceptor trap on all drains which are outside the houses; the drain will thus get a better gradient throughout, and no possible harm can be done to the householders, while great benefit would accrue to the sewer, which would be properly ventilated and be kept much cleaner.

SEWAGE AND REFUSE DISPOSAL

The Latest System of Bacterial Treatment of Sewage in Great Britain—Description of Tanks, Distributing Chamber, Sludge Beds, Etc.

THE latest system of sewage treatment by bacterial agency to claim the attention of municipal engineers has been invented and patented by Messrs. Haller and Machell, Civil Engineers, of Dewsbury, and its main features will be gathered from the following description:—

The accompanying drawing is a ground plan and section showing a general arrangement of works for an installation capable of dealing with 100,000 gallons of domestic sewage and liquid trade refuse in 24 hours, when the mixture is constituted in about the following proportions:—

Description of Sewage.	Percentage.
Domestic Sewage	36.65
Wool scouring, dyeing, and finishing	24.55
Woolen manufacturers' waste liquids	5.50
Brewers, cotton spinners, and curriers	.85
Gas and chemical works	.25
Miscellaneous and other sources as reservoir overflow, condensing water, etc.	32.20
	100.00

An admixture of these proportions is considered to be a strong crude sewage, contains an average of about 120 gallons of solids to the gallon, and is of a nearly neutral nature, *i. e.*, neither strongly acid nor alkali.

Detritus Tanks

Upon the sewage arriving at the disposal works it is received into one of two detritus tanks, each tank being 27 feet in length by 6 feet in width, with its bottom 4 feet below the level of the invert of the main outfall sewer. The inside of each tank is fitted with three rows of scum boards and wood troughs fixed at a depth of 18 inches below the surface of the water, two rows of baffle boarding being placed at an angle of thirty degrees from the perpendicular at a distance of 4 inches apart under each of the troughs, which act as screens.

The increased area of the tanks over the size of the inlet sewer so much reduces the rate of the velocity of the sewage upon its entry into the tank as to allow corks, rags, and other light substances held in suspension, to rise and float on the surface until they reach the sum board, when their further progress through the tank is arrested; while such portions as are, or may become by saturation, too heavy to continue to float on the surface, settle and find a resting place in the troughs, or become entangled in the baffle boarding provided for the purpose of separating the finer substances held in suspension from the débris and other heavy materials carried along in the sewage before its final subsidence at the bottom of the tank.

Experience proves that by this method of straining the sewage, the 120 grains of solids originally contained therein will have become reduced to 44 grains per gallon.

Distributing Chamber

The sewage, after leaving the detritus tank or tanks, flows by gravitation along an 18 inch diameter pipe into an open circular tank, 12 feet in diameter, the bottom of which is 6 feet below the invert level of the conduit.

From this the sewage is equally distributed, and flows by gravitation through cast-iron pipes placed beneath the surface level of the ground into six open circular tanks for treatment by anærobic microorganisms, and is delivered at an average rate of 4,167 gallons per hour.

Anaerobic Tanks

The anærobic tanks consist of six open circular tanks constructed of 9 inch brickwork. Each tank is 18 feet in diameter by 13 feet in depth below the surface level of the sewage, and its bottom is constructed in the shape of an inverted cone so as to allow the removal of the sludge without the necessity of emptying the whole tank.

To enable this to be accomplished, each tank is provided with a 4 inch diameter cast-iron sludge pipe, fixed at an angle of about ten degrees from the perpendicular, and extending from one side of the tank at a height of 6 inches above its surface level, to within 6 inches of the bottom of the centre of the tank. From each centre pipe a 3-inch diameter branch pipe is fixed at its outlet end with a back flap, and so fixed as to allow of the sludge being delivered into an open conduit or sludge carrier, the invert of which is placed 9 inches above the surface of the sewage when flowing through the tank.

The sewage flows out of the distributing chamber by gravitation into each tank at a depth of 4 feet below the surface level of the sewage, through a cast-iron pipe having two branches of arms, with their outlet ends placed 6 feet apart, and discharging in a downward direction, so as to prevent any rotary motion being imparted to the sewage whilst in the tanks.

The effluent flows out of each anærobic tank by gravitation through a cast-iron pipe, the lower end of which is fixed at a depth of 2 feet

below the surface level of the liquid in the tank, and its upper or outlet end connected to an open conduit constructed of cement concrete below the surface level of the ground, 18 inches in width by 2 feet 6 inches in depth, by which the effluent is conveyed for distribution on to the bacteria beds for further treatment.

A Continuous Flow

These tanks are intended to be worked on what is known as the continual flow principle. Each tank has a holding capacity of 19,333 gallons, being equal to a working capacity of 696 gallons per hour, when the sewage is flowing through the tank at a forward rate of progress not exceeding 5 inches per hour, or a total working capacity for the six tanks of 100,000 gallons in 24 hours, with a sludge storage capacity of 16,000 gallons, making the total holding capacity to be 116,000 gallons; or, in other words, it will take the sewage 24 hours from its entry to pass through any one of these tanks.

The primary object in making these tanks 13 feet in depth is to reduce the surface area of the sewage, so as to get the surface of each tank covered with a thick scum in as short a time as possible, thereby excluding light and air from the sewage, and thus assisting in the production of anærobic action in the shortest time. In this way, to a considerable extent, are overcome the difficulties (which have been experienced in all other systems of sewage treatment) in dealing with the lanoline, etc., contained in wool washing liquids.

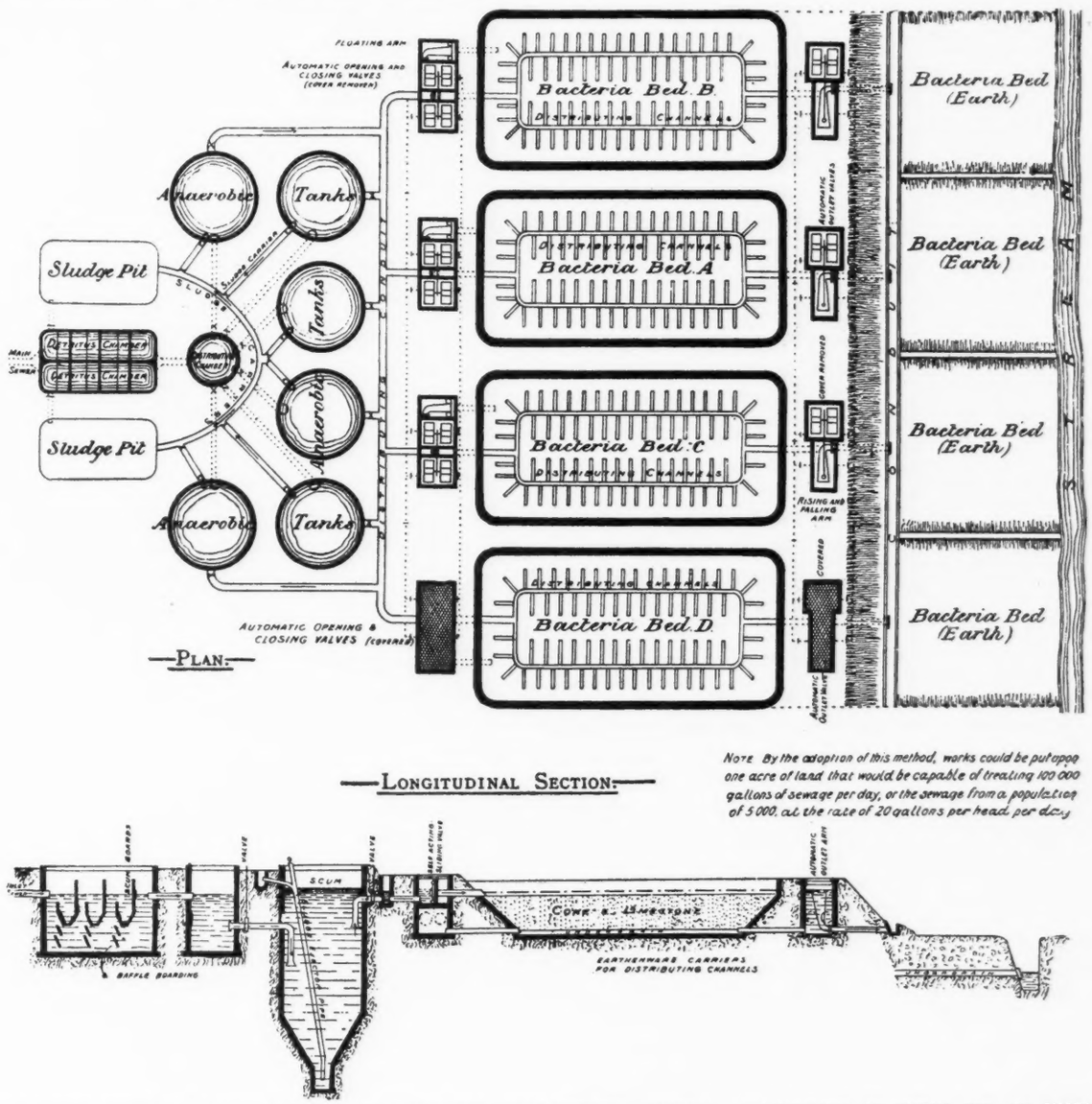
Working the Anaerobic Tanks

When first commencing to work these tanks, they are to be filled with the sewage to be treated. When this has been done the inlet valves to the tanks are to be closed down and the tanks to remain standing full for a period of three days, which allows time for the propagation of the anærobic micro-organisms contained in the sewage, and the consequent decomposition to take place.

On the expiration of the three days from the first time of filling, the inlet valves are opened and fresh sewage admitted into the whole of the tanks to the extent of 50,000 gallons per day of 24 hours, passing through the tanks on a continual flow system at a forward rate of progress not exceeding 2⅝ inches per hour. This daily quantity is not to be increased until such times as anærobic putrefaction has become fairly well established, which usually takes about fourteen days to become properly developed.

After this anærobic action has become well developed, the rate of flow through the tanks is increased to the extent of 15,000 gallons per day until the maximum amount of 100,000 gallons per day of 24 hours is reached.

The sewage, which upon first entering the distributing chamber contains 44 grains of suspended solids to the gallon, after passing through the anærobic tanks and being discharged into the effluent conduit contains only 12 grains per gallon, being equal to a daily re-


Bacteria Bed (Earth)
Bacteria Bed (Earth)
Bacteria Bed (Earth)
Bacteria Bed (Earth)
Bacteria Bed B
Bacteria Bed A
Bacteria Bed C
Bacteria Bed D
Anaerobic Tanks
Anaerobic Tanks
Anaerobic Tanks
Sludge Pit
Sludge Pit
Automatic Opening and Closing Valves
Automatic Opening & Closing Valves
Rising and Falling Arm
Covered
Plan:
Longitudinal Section:
Note By the adoption of this method, works could be put upon one acre of land that would be capable of treating 100 000 gallons of sewage per day, or the sewage from a population of 5 000, at the rate of 20 gallons per head per day
Scum
Baffle Boarding
Earthenware Carriers for Distributing Channels

THE SELF-ACTING TRIPLE TANK SYSTEM OF SEWAGE TREATMENT—PLAN SHOWING GENERAL ARRANGEMENT OF WORKS FOR AN INSTALLATION CAPABLE OF DEALING WITH 100,000 GALLONS OF SEWAGE PER DAY

tention in the tanks when working of 32 grains per gallon; 50 per cent. of this retained amount will be digested in the tanks, leaving 16 grains in a form not further reducible by bacterial action (being largely composed of mineral and earthy salts from the manufacturers' waste liquids) to be removed periodically from the tanks as sludge.

Therefore 100,000 gallons of sewage containing 16 grains per gallon will contain 230 pounds in weight of solid matter, which is equal to 320 gallons of liquid sludge (having a density of 5,000 grains to the gallon), or, say, about 4 cwt. of semi-dry sludge.

The Removal of the Sludge

out of each of the anærobic tanks is effected by backing up the sewage in the following manner:—(1) The outlet valve of the tank to be cleansed is closed. (2) The inlet valves of the remaining five tanks are also closed, and the sewage allowed to rise in the main sewer; the detritus tank, the distributing chamber, and the tank to be cleaned, say until it reaches a height of 2 feet 6 inches above its normal flow level. (3) The pressure of the extra sewage as it rises in the tank forces the sludge lying in the inverted cone upwards through the 4-inch cast-iron sloping pipe, and delivers it into an open conduit at a height of 9 inches above its normal flow level; the sewage at the same time raises the tough, felt-like scum on its surface level with the ground surface of the tank, and a portion of such scum may readily be removed by means of spade and rake, and its thickness reduced as much as may be desired. The whole process does not take more than ten or fifteen minutes. Each tank can be cleaned out separately or jointly as may be desired.

The adoption of this method of cleaning does away with the necessity of emptying the anærobic tanks and thus having to start the anærobic action all over again.

Sludge Beds

The object desired to be attained in discharging the sludge into an open conduit is to enable the workman to see its density, it not being advisable to remove any thin watery sludge from the tanks, as by doing so there is always the liability of carrying away with the half-digested sludge a large portion of the anærobic organisms, which at all times should be avoided.

The sludge is delivered by the open conduits into the sludge pit or beds (shown on the accompanying plan to be situated on either side of the detritus chamber) at a height of 9 inches above the normal flow level of the sewage as it enters the works, thus allowing for the clear effluent from the top of the sludge being conveyed by gravitation into the detritus chamber; the remaining portion of the clear effluent is drained away by agricultural drain pipes laid below the bottom of the sludge pits, having their outlet ends protected by back flaps, and discharging into the bacteria beds. By this method the sludge soon becomes solidified, and can be removed away by carts without any nuisance being apprehended.

The Bacteria Beds

These beds consist of one set of three, with an extra one to be held in reserve for use whilst one of the others is resting. They have a surface area of 1,414 superficial yards, and an average depth of 3 feet 3 inches.

In the construction of bacteria beds due consideration must at all times be given to the nature of the sewage, as to whether it is a neutral, alkali, or an acid body which has to become oxidized by their aid.

As previously stated, the sewage when it first entered the works was of a neutral nature, but the micro-organisms contained in the sewage have in the process of breaking up of the organic matters absorbed a large portion of the oxygen, and in return given off carbon dioxide, etc.

By this action on the part of the anærobic microbes and on account of the sewage not containing sufficient materials with which the carbonic acid can combine the ærobic micro-organisms contained in the liquid become languid and inactive, leaving the anærobic organism to carry on the work of breaking up the organic matters until such times as the sewage becomes altogether changed, so much so, in fact, that by the time the liquid leaves the tank at the end of 24 hours it may be considered to consist almost entirely of carbonated acid water.

In order to oxidize this liquid in the shortest time possible, so that the ærobic organisms may again become active, the bacteria beds must to some extent be composed of carbonate of calcium—or what is more commonly known as limestone—which absorbs the carbonic acid, and the process of decomposition is hastened in a somewhat similar manner to that which is effected when the farmer adds lime to the soil.

The floor of each tank or bed is drained by agricultural drain tiles laid on the bottom of the tank; these are then covered with limestone, the body of the beds is then formed of clinker, coke breeze, or other hard materials, a quantity of limestone sufficient to neutralize the effect of the carbonic acid contained in the liquid being intermixed. All the coke breeze, limestone, and other material forming the body of the bed are to be of such a size as will pass through a sieve of a ¾-in. mesh, and all such portions as can pass through a sieve of a ¼-in. mesh must be rejected.

The method of distributing the tank effluent over the beds is by two longitudinal rows of 12 in. diameter half-channel pipes, with 6 in. branches running right and left, and placed three feet apart; the 12 in. half-channel pipes are rested upon 12 in. diameter sanitary pipes placed in an upright position on the floor of the filters and filled with coze breeze; by these means any settlement of the channels is prevented, and the sewage is distributed evenly over the surface of the filtration areas.

The liquid working capacity of each bed is 25,000 gallons, and the tank effluent is delivered into the distributing channels (which are on the surface of the beds) by gravitation.

The process usually adopted at the commencement of working these beds is to begin with one filling per day for the first month; by that time the materials of which the beds are composed will have become permanently coated with a black, slimy, gelatinous matter. This matter consists of ærobic micro-organisms which are most actively engaged in propagating their species and in breaking up the organic matter after the effluent has been withdrawn from the beds. It is, therefore, of the greatest importance that the liquids should be admitted into the beds and drawn therefrom at a very slow rate, so as to prevent the washing away of any micro-organisms and the organic matter.

Automatic Opening and Closing

We now come to what may be considered the most important part of the system; that, is, the automatic filling, resting, slowly emptying, and aerating of the filters or beds.

For this purpose three beds or filters are used, arranged to act in succession is repeated cycles, and fitted with apparatus in conjunction therewith for automatically directing the liquids successively or alternately to and discharging it from each filter of the series, allowing the liquid to remain at rest for a given period in each filter, and the discharge being drawn so slowly from the top of the liquid as to disturb the micro-organisms as little as possible, while sufficient time is given after each discharge to insure the proper aeration and oxidation of the filtering materials.

The filling and discharging of the three beds or filters is automatically effected by the overflow from the last bed filled.

In conjunction with each of the three beds is a sliding valve, fitted with ground faces, controlling the inlet pipe. The valve is connected by levers to floating cylinders located in separate chambers, which will hereafter be referred to as opening and closing chambers.

When the first bed is full, a small quantity of the filtered effluent overflows therefrom through a floating arm or pipe into its own closing chamber, which is coupled by a pipe to the opening chamber of the next bed to be filled, so that as the water rises in the closing chamber of the full filter it likewise rises in the opening chamber of the bed to be next filled, and the floating cylinders in the said chambers are raised, with the result that the next valve of the full bed closes, and the valve of the next bed opens, and the liquid commences to run into the bed to be next filled.

The same action as above is repeated when a second bed is full, and the third is to be filled, whilst the third bed in turn is coupled to the first bed, so that the triple action is repeated over and over again so long as liquids continue to flow to the beds.

When the effluent in the bed being filled has risen to a given height, it flows through a pipe into a chamber in which is fixed a balance float

connected by a lever to a rising and falling outlet pipe, fixed in a chamber which is connected to the last bed filled; the effluent rising in the bed then filled raises the balance float fixed in the chamber attached to this bed; this action tips the lever and lowers the rising and falling outlet pipe fixed in the chamber attached to the last bed filled, thus drawing off the effluent from the top slowly and without disturbing the whole contents of the bed. After the liquid in the bed has been drawn off, the rising and falling outlet pipe remains stationary at the bottom of the chamber until the next action takes place.

Each bed has its own rising and falling outlet pipe, which is actuated by the liquid rising in the next bed filled, or by the lowering of the liquid in the next bed discharging. Any number of beds in sets of three may be employed, each set being independent of the other sets; the bed and apparatus can be made to deal with any quantity of liquid, as circumstances may require; and each set can, if desired, be provided with an additional bed to be brought into action instead of any in the set of three.

The filtration areas are shown on the plan to be sunk to a depth of three feet below the surface level of the ground; to be well underdrained; and the body of the filter constructed of burnt clay and limestone, with all the small particles that will pass through a ¼-in. mesh taken out, the top 15 in. of the bed is to consist of a porous soil, obtained from the surface of a good field, one of the four filtration areas to rest for aeration one week out of every four.

The final effluent from the filtration areas will be found to be of a neutral quality and apparently clear, though a slightly yellowish tint might be observed if seen through a glass tube 12 in. long; however, no odor will be given off and no putrefactive re-action will occur.

No detailed estimate of the cost which would have to be incurred in constructing an installation capable of dealing with 100,000 gallons per day has been prepared, as the cost in one case is no criterion of the cost incurred in another, as so very much depends upon the suitability of the land upon which the works are to be constructed and the cost of materials in the neighborhood. Then, again, there is the nature of the sewage proposed to be dealt with to take into consideration. As the sewage from a town supplied with hard water, and the probability that the manufacturers' waste liquids may contain a large proportion of curriers' waste liquid, in which case the sewage itself will contain a sufficient base for the absorption of the carbonic acid gas made in the anærobic tanks, without any addition of limestone in the bacteria beds, so that the beds could under these conditions be constructed of clinker and coke breeze; and no better material could be used, however costly.

The inventors are making a special study of the purification of domestic sewage, as well as manufacturers' waste liquids, and will at all times be pleased, in receiving particulars and a sample of the liquid to be treated, to prepare outline plans and estimates for the construction of the works.

MILLIONS FOR NEW YORK'S SEWERS

$10,000,000 Needed to Rebuild—Present System Too Small—Many Streets Unsewered

As a result of investigation made by Commissioner of Public Works George Livingston of the Borough of Manhattan, New York, regarding the sewer system of that section of the city, some startling disclosures were made. Mr. Livingston quotes extensively from various reports that have been made from time to time by engineers and reviews the history of sewer building from its commencement in 1676.

The first sewers of the city were to relieve the low area from an accumulation of storm water and were built either as wooden or stone box drains, according as those who demanded them found best. Later on they were built of brick. Occasionally connections were made from buildings to receive the waste and overflow from cesspools, the practice growing until most of the houses of the city were connected with the sewer.

City Takes Charge of Sewer Construction

In 1849, for the first time, the construction and character of sewers were regulated and placed in the hands of a department of the city government. About seventy miles of sewers then existed and were built on petition of property owners or upon a suggestion from the city surveyor, the Common Council directing the building of sewers and designating the size and other features. At that time the sewers were usually very large, seldom less than four feet in diameter, but no general system was carried out, each sewer being placed and proportioned only for immediate needs, irrespective of what duty they would have to perform in the future. Poor construction was the rule at that time, most of the connections being made at right angles and little attention being paid to giving the flow uniformity and making the interior of the sewers smooth.

The square form was abandoned in 1860 in favor of the egg shape and most of the sewers then built were 4 x 3 and 4 x 2.8 feet with vertical dimensions the larger. In 1865 the legislature of the State authorized the adoption of a general sewerage system. The city was divided into natural water sheds or districts and the best lines of main sewers and outfalls were determined. At that time about two hundred miles of sewers had been laid and about twenty-five hundred catch basins placed to receive the surface water from the streets. This new system, however, extended over those parts of the city not already sewered. The existing works in the most densely built up districts were not replaced by better ones and many of them remain in their original condition to-day. The growth of the city was so rapid and demands for new sewers so great that the available funds did not permit of rebuilding the old sewers, most attention being paid to sewering new districts of the city.

Vitrified Pipe Sewers Introduced

In 1864 the use of vitrified pipe, wherever its capacity would be sufficient, was decided upon, as the smoothness of the surfaces greatly aided the removal of filth. By 1869 some sixty miles of these pipe sewers were in operation and great satisfaction had been given by them, instances of failures being exceedingly rare. These pipe sewers were effectively cleaned by the use of hydrants and hose. A change was made in the management of the sewers in 1870 by the creation of the Department of Public Works, which was placed in control of the sewers in Manhattan. Greater care was devoted to carrying out the details of sewer work, the specification for construction were improved, and the sewers built of greater strength. Greater attention was paid to give brick sewers smooth interior surface. The spurs for house connections were placed at uniform distances of fifteen feet on either side and the diameter of house drains made six inches. As far as possible the depth of sewers was fixed from twelve to fifteen feet below the pavement. Manholes were placed about one hundred feet apart, and while the older ones had been made square with square covers, when pipe sewers were introduced the manholes were made round with tightly fitting covers. Five years later (1875) perforated covers for manholes were introduced for the purpose of ventilation.

Rapid Transit Tunnel Necessitates Double Sewer System

The tunnel of the Rapid Tansit Railroad cuts the sewer system of Manhattan in half, diverting portions of it east and west, and makes necessary a double system of sewers alongside the tunnel to accommodate the buildings along its lines. On account of its depth it is impossible to run any sewer across the line of the tunnel. The depression of the railroad yards at the Grand Central Depot will form another barrier to the sewer system. The whole dainage of th system in the vicinity of the yards will have to be taken north to such a point where it can cross and be carried to the East River. Inas-

much as the transportation problem has been considered paramount, complete reconstruction of the Manhattan sewer system must be undertaken.

City Should Own Sewer Cleaning Plant

The work of cleaning the sewers and catch basins is now done by contract, according to the custom that has been followed for years, but Commissioner Livingston is of the opinion that the cost of this work is greatly in excess of what it would be should the city do the work itself. He recommends therefore that his department be equipped with the proper plant, including the latest design of sheet-iron carts, modern tools, etc. The horses and carts used by the contractors are in most cases old and dilapidated, and they greatly increase the work of the street cleaning department on account of the droppings that fall from them as they pass through the streets.

Regarding the construction of a large tunnel which would accommodate all pipes and wires in the sewers, Mr. Livingston considers that while this idea would be an ideal one, the practical carrying out of the work would be fraught with the most insurmountable difficulties. In the first place it would necessitate the consolidation into one of many pipe lines that are at present laid in the public streets, or else the construction of a tunnel as large as the present Rapid Transit tunnel. If it were possible to limit the number of pipes to a certain number it would permit of the owners of them inspecting their property without tearing up the streets. It is a question, however, in the mind of the Commissioner whether such a condition of affairs could be brought about.

Inasmuch as sewers are laid underground and so removed from the sight of citizens, it is difficult to impress upon the latter the necessity for rebuilding sewers until some failure of the same occurs. Therefore the Department of Public Works, or the Department of Sewers, which is its successor, has undertaken the work of re-building the sewers in the lower part of the city by degrees, taking advantage of any breakdowns in any sewer to demonstrate to the surrounding property holders the bad condition into which the sewers had fallen.

Large Buildings Cause Great Water Consumption

While the idea that the erection of "sky-scraper" buildings necessitates a greatly increased sewerage is not strictly true, still the great population of those buildings causes a very large consumption of water in working hours, and the sewers must be large enough to carry off this water waste. From records in the department it is estimated that the consumption of ten of the largest office buildings is 790,000 gallons of water a day. Assuming that this quantity is discharged into the sewers between 8 A. M. and 6 P. M. it shows that the sewers in the neighborhood were compelled to accommodate three cubic feet of water per second. Ten of the largest hotels are reported to consume 1,850,000 gallons of water, principally between 6 A. M. and 11 P. M., which is 2.7 cubic feet a second. If these ten buildings and hotels were grouped together and discharged into one sewer, the water consumption would equal the capacity of a 12-inch pipe laid on a grade of six inches in a hundred feet.

A rain-fall of one inch in ten minutes is a rare occurrence in New York, but considering that the territory surrounding the greater part of the sewer system is practically impervious, about eighty per cent. of this rain-fall would get into the sewer during the time the rain was falling. As the water front is approached the elevation of the ground decreases until it reaches about five feet above high water bulkhead line. On this account a large sewer cannot be constructed as it is necessary to increase the number of outlets according to the area to be drained. A sewer of six feet in diameter is about the maximum that can be built. Another trouble in this section is the immense number of pipes laid across the line of outlet sewers and where they occur on streets not more than ten feet above the tide level the outlet sewers have been cut in two to accommodate these pipes. Therefore to secure the best results outlet sewers of from four to six feet are the only ones practical under the circumstances.

Sewer System Should Be Rebuilt

The usefulness of the present sewer system would be much promoted, according to the Commissioner, by rebuilding. At the rate of $50,000 a mile the work would cost not less than $4,000,000. Heretofore this work has been done under the title of "alterations and improvements," the cost being assessed upon the property benefited. In addition to the sewer system already in operation there are twenty-four miles of streets in Manhattan Borough not yet sewered. To complete the system, therefore, about $1,200,000 is necessary. To maintain a condition of sewer cleanliness, an annual expenditure of $275,000 is required. The oldest sewers built previous to 1865 should be reconstructed at a cost between $4,000,000 and $10,000,000.

In closing his report Commissioner Livingston suggests that the extension and improvement of the sewerage system would be materially aided by the appointment of a committee of experienced engineers to inspect and report upon the sewer systems of Paris, Berlin, Vienna, and other cities of Europe, and he thinks that it might be advantageous to adopt the system of soil fertilization by means of the sewage as is done in some of the European cities.

MUNICIPAL INSURANCE IN ENGLAND

The subject of municipal insurance has been under consideration in the cities of England for some time, but only recently were steps taken to definitely extend the scheme to a sufficient number of cities to form a wide base for the successful carrying out of the project. Representatives from twenty-seven boroughs and the city and metropolitan district of London formed what was known as the Shoreditch Conference on Municipal Insurance and agreed to join as the "Municipal Insurance Board, Ltd.," and regularly enter on the business of insuring their own property against loss. The large rates exacted by the private insurance companies have been the cause of this undertaking, which was first attempted in 1900. The private companies defeated any attempt to pass a bill through Parliament granting permission to the London County Council to insure local authorities in London, paying any losses out of the taxes, and so the matter was dropped. Nottingham and Glasgow in 1898 had formed fire insurance funds and the London School Board also formed such a fund in 1878, and this fund, in the spring of 1900, amounted to $180,865, while the charges on losses were only $13,300. In 1893 as the fun had reached the sum of $150,000, which, with the interest, was able to meet all normal risks, no further payments were paid into the fund except the interest.

Inasmuch as the property of a local authority would not afford a sufficiently wide base for an insurance fund, it was determined to form a combination of other municipal corporations and so make the field a broad one. Those joining the scheme must continue in it for five years and any losses beyond the yearly premiums are to be met by increasing the premiums for subsequent years and this will fall upon the taxpayers in proportion to amount of property represented by the parties in the scheme.

Some of the Swiss cantons compel cantonal insurance against fire. In Zurich in 1895 the rate for insurance was about 10 cents on the $100, and, on account of the large surplus accumulated, the next year the rates were reduced to six cents on the $100. It is stated that the London municipal authorities pay an average (1900) of $73,395 yearly on $56,050,575, the average loss being $12,005, less than one-sixth of the premiums. In Germany municipal insurance is general, each year the rate being fixed according to the needs. In 1896 the figures are given as, sum insured, $905,000,000; premiums, $364,540; losses paid, $156,940; expenses, $28,530; contribution to fire department, $164,915. In England in 1899, 377 municipalities paid $135,745 premiums on $116,758,790 of insurance. The average losses paid for twenty years were $25,202, including a loss in one fire of $132,705, and the premiums paid during that period averaged $111,448 yearly, leaving an average excess of premiums of $86,247. The London fire insurance companies contribute but from two to four per cent. of their premiums toward the fire department.

ANNUAL MUNICIPAL ART EXHIBIT

At the National Arts Club—Many Objects of Importance—Fine Collection of Plans, Models and Designs—Visited by Throngs of People

By Arthur H. Battey

THE second annual exhibition of municipal art held under the auspices of the Municipal Art Society of New York, at the National Arts Club, 37 West Thirty-fourth street, will close the first week in April. Under the leadership of Messrs. John De Witt Warner and Frederick Stymetz Lamb, president and secretary, the society has had remarkable success during the past year. It has secured the co-operation of the mayor and the heads of departments, especially that of the Municipal Art Commission, Department of Parks, Commissioner of Bridges, etc. It is no longer vegetating in a corner, with an occasional appearance to unveil a monument or inaugurate some other small municipal improvement but has developed into a large, strong, aggressive organization.

Mr. William Laurel Harris, chairman of the Exhibition Committee, has met with many difficulties in assembling the exhibit this year but the result achieved is good evidence of his success. Many of the most interesting objects can be shown only by photograph or original plan; a few by plaster model. Thus the electrolier designed by the Sculptor Ciani, which will rise in bronze from the centre of an "isle of refuge" in front of the Fifth Avenue Hotel is to be found here the size of life, but in staff, showing its square plinth decorated at top with four goat heads, its lower shaft embellished with a charming round of dancing little babies, its capital with dolphins. And here is a model in plaster of the pavilion or wet-day refuge designed by Mr. Arnold W. Brunner for Seward Park, which is being erected—a broad terrace covered by a roof supported by Ionic columns with a long shallow building in the rear. But there are not many exhibits proper to a Municipal Art Society which can be shown like these.

A SMALL PORTION OF THE MUNICIPAL ART EXHIBITION

The new Public Library is well presented from the preliminary sketch by Carière & Hastings, giving the Fifth Avenue front, to the suggestion of the same architects for the arrangement of the rest of Bryant Square. This is a formal park treatment in harmony with the architecture of the library, having a basin in the middle, and, like all of this firm's work, very Parisian in style. The model for this important edifice is not here, but an excellent photograph of the model represents it.

There are other parts represented in colored cartoons on the ground plan, such as Brunner's scheme for Thomas Jefferson Park, the landscape architect being Samuel Parsons, Jr., and the latter's plan for Seward Park. In photographs we get St. John's Park, Manhattan, and the present appearance of the proposed De Witt Clinton Park on Twelfth Avenue, with the colored ground plan for its treatment by Mr. Parsons. From the show of the Architectural League come the water color pictures of the stately buildings in late English Gothic designed by Mr. George B. Post for the College of the City. A bird's-eye view of a proposed "Marine Park," to run along the Hudson from Seventy-second street to Spuyten Duyvil is contributed by Mr. Milton See.

But these local parks are supplemented by others from a distance. There is a series of views of Franklin Park, Boston, in the photograph, and another, loaned by the American Institute of Social Science, exhibiting the municipal railway of Paris under construction. Color is contributed by the aquarelles of Ora Coltman, taken in Paris; we get very pretty little water colors of Notre Dame, Versailles, the Luxembourg Gardens, and so forth. From M. Jules Guérin we have a number of city views drawn in a very pleasing style, and Harper's Weekly lends the drawings, called "Modern American City Beautiful," being an attempt to put in shape certain ideas of the best arrangement of public buildings. Particularly good are the color sketches of Jerome Myers from life among the lower east siders, that Levant in the Borough of Manhattan.

Some large models on the floor of the galleries teach citizens how they can hang boxes of flowers beneath the window ledge without interference from shutters. They are not attractive to look at, but seem practical enough. Here also are attempts at the Poillon kilns to supply window pots which can be ranged side by side, so held by their forms that there is no danger of them toppling outward, to the detriment of what is down below.

The designs for bridges by H. and Palmer Hornbostel for the proposed Manhattan Bridge are remarkable for the slenderness of the piers that support the cables; they are tall iron masts, four of them side by side, and since they take the place of the stone piers we see in the Brooklyn Bridge one may imagine how light is the entire fabric of the bridge without the solid props of stone. This is a better design than that which suggests tapering square iron towers of openwork which look like exaggerations of those openwork newel-posts they used fifty years ago in front of the houses in Bleecker street.

It would be too long to enumerate all the heterogeneous things that go to make up an exhibition of a Municipal Art Society even when confined to a modest space such as the galleries of the Arts Club offer. It is not for hunters of picture galleries, though pictures are here, too; but it ought to prove suggestive to city officials, architects, landscape engineers, and citizens who are earnest for town betterment. If one may judge of the future from the swift progress of our Municipal Art Society of late years we may look forward to exhibitions rivaling and perhaps outdoing the Architectural League in the number and interest of their contents.

MUNICIPAL OWNERSHIP CONVENTION

The Pros and Cons of Public Ownership Ably Discussed by Men of International Reputation —The Situation in Great Britain as Portrayed by the Editor of *The Municipal Journal*, London

THE National Convention on Municipal Ownership and Public Franchises, held under the auspices of the New York Reform Club Committee on City Affairs, in the assembly room of the Club, 233 Fifth Avenue, New York, February 25 to 27 inclusive, a full programme of which we published in our February issue, was held on the date specified. It brought together about one hundred delegates, the most of whom were from various parts of the United States, and a few from Canada and England. It was the most representative gathering ever held in this country to discuss this subject. An effort was made to have the sentiment about equally divided on the general proposition of municipal ownership, but those in favor were slightly in the majority. The negative side of the question, however, was given every opportunity and that side was skilfully handled and ably defended.

The chairman of the committee was Mr. John G. Agar, and the secretary, Mr. John Martin, who was most largely responsible for the success of the convention.

The papers and discussions of the convention will be published in full in *"Municipal Affairs,"* the quarterly organ of the Reform Club, which is so well known. It will be impossible for us to publish all the papers in full, owing to lack of space, but we shall publish in full the more important ones, particularly those which deal with the question in a general way, using them in serial form. As great interest centers in municipal ownership in Great Britain, we begin the series with the paper of Mr. Robert Donald, editor of *"The Municipal Journal,"* London, on "Recent Attacks on Municipal Ownership in Great Britain." This will be followed in a future number by the paper of the Hon. Robert R. Porter, former Director of the Eleventh Census in the United States, who has been such a vigorous protestant against the practice of municipal ownership here and abroad. The subject of his paper is "European and American Methods and Results Compared." In subsequent issues of the MUNICIPAL JOURNAL AND ENGINEER will be published some of the other papers, particularly those relating to electric lighting and public telephones.

Recent Attacks on Municipal Ownership in Great Britain

By Robert Donald

THE rapid extension of municipal ownership in Great Britain during recent years has raised fears among one section of the public who see dangers in increasing public control and has provoked the envy of company interests which feel that the scope for their undertakings is seriously curtailed. At a time when the stress of foreign competition is severely felt in many branches of industry it is not surprising that people, seeking excuses for commercial apathy, should see one in the bogey of "Municipal Socialism." Railway companies, convicted of administrative capacity leading to declining dividends, welcome the anti-municipal attack. Had not municipalities increased rates and established electric tramways—both to the detriment of railways? Electric power and tramway companies, seeing their field of exploitation narrowed by municipal ownership, were also eager and interested backers. Traders in turn were warned that the encroachments of municipalities meant the end of all private profit, and so by misrepresenting existing conditions and imagining dangers which do not threaten, quite a formidable looking case can be made out against what is termed "municipal trading" or "municipal socialism," but would be more correctly described as municipal ownership.

ANOTHER VIEW OF THE MUNICIPAL ART EXHIBITION

The municipal, or collective ownership of services of public utility, such as gas, electricity, street railways, is not "socialism." It has none of the characteristics of socialism. Except in the case of water supply, which is municipalized as a measure of sanitary necessity, and which is paid for, for domestic purposes, according to the needs of tfhe consumers, not according to their means, all municipal supplies are paid for according to the means of the consumer. Municipal ownership is more correctly described as a corporative undertaking, in which all the citizens are shareholders and directly or indirectly participate in the benefits. In dealing with a great movement which tends to place the supply of public utilities and the control of common services in the hands of local governing authorities, one should not approach it from a sectional standpoint. The interests of the whole community must always be the chief, if not always the only, consideration.

LOCAL INDEBTEDNESS ANALYZED

TWO statements frequently met with in discussions on municipal ownership, are intended to cause some alarm among those who take a superficial view. These are the rapid increase of local indebtedness and the steady rise in recent years of local taxation. "Municipal trading," as it is called, is held responsible for both. A misleading comparison is made between the national debt and local debts. Between 1875 and 1900 the national debt decreased £139,966,974, and in the same period the lo-

cal indebtedness of England increased £201,000,000. This little comparison has been a fruitful cause of misconception. The national debt represents chiefly the cost of wars. Loans are still outstanding for the American War, for the Crimean War and for other wars for which there is absolutely nothing to show. There are few assets to set against the national debt. The assets of municipalities, on the other hand, outweigh their liabilities. The local debt is being paid back within an average period of thirty years, so that it disappears as fast as it is created, as we are just now passing through a period of exceptional activity in local government. Within recent years the whole system of local government in rural districts and in smaller towns has been reformed. Heavy expenditure has been incurred for hospitals, technical schools, roads and bridges, asylums and sanitary purposes. The cost of board schools and poor law institutions has greatly increased, and just at this period, when the health and educational departments of public services demand most support, municipal authorities have been active in promoting electricity and tramway undertakings. Over 35 per cent. of outstanding loans are borrowed for undertakings which are of a productive character and are therefore profitable investments for the community. An increase of debt represented by such assets as water, gas, tramways and electricity undertaking need cause no alarm, and the financial security of municipalities is good, although in consequence of the South African War they have had to pay increased interest in recent years and have not always received all the money they asked, but in this respect English industrial concerns have found themselves in the same position.

Taxation Decreased by Municipal Industries

The developments which have taken place in the functions of local governments, in the advance of sanitation, the progress of education, and the reform in poor law administration are chiefly responsible for the rise in local taxation. At any rate, the extension of municipal ownership is not the cause. On the contrary, the public management of municipal services has been the means of frequently relieving the local rates. Profit-making at the expense of a section for the benefit of all is not the sole aim of municipalization; it is only part of a policy which present conditions justify if they do not render expedient. That municipal control is efficient from the ordinary commercial standpoint is shown by the following table, giving the extent to which rates were relieved last year in a number of towns from municipal undertakings, after all charges, interest and sinking fund payments had been met:

Town.	Amt. of relief in the £		Town.	Amt. of relief in the £	
	s.	d.		s.	d.
Barrow	0	10	Liverpool	0	8
Bath	0	10	Macclesfield	1	2½
Blackpool	0	9	Nottingham	1	2
Bradford	0	4½	Oldham	0	9
Burnley	0	6¼	Preston	0	9
Darlington	1	8¾	Rochdale	0	9¼
Derby	0	9	Stafford	1	3¼
Dewsbury	0	7	Stockport	0	8¼
Hull	1	3½	Stockton	0	6
Lancaster	0	11	Warrington	0	7
Leicester	0	11	Wigan	1	7¾

These figures do not convey very much in themselves, except to the ratepayers in the towns who enjoy the relief.

Our large cities having municipalized services need not fear to challenge comparisons with companies. The Manchester City Council, for instance, last year had surplus profits amounting to £85,000. During the last five years the surplus profits from its markets, gas, electricity and tramway undertakings used in aid of local taxation amounted to £442,120. In the same period it lowered the charges for water. These surplus profits remain after interest on capital has been paid and payment set aside for a redemption fund. The surplus profits from gas, markets, electric lighting and water undertakings of Bolton during the last five years were £200,465, and Bolton, which is one of the cities which has carried municipalization farthest, having municipal water, gas, electricity works, street railways, slaughter houses, cold stores and ice manufactories, has correspondingly a lower rate in local taxation, although it supports six free libraries, two museums, an art gallary, a technical and engineering school, baths, including Turkish baths, hospital, etc. The population is about 100,000.

Another illustration of the profitable character of municipal ownership in a smaller town is found in the case of Darlington, an industrial town in the county of Durham, with only a population of 44,000. It manages to distribute surplus profits every year equal to 30s. per family, or 5 per cent. on the whole of its outstanding debt. Last year, for instance, the following surpluses were given in aid of rates: From water, £6,137; from gas, £6,967, and from markets, £440. It is just beginning to earn a profit on its electricity supply and has recently municipalized the tramweys, and will soon earn large profits from these. Were Darlington served by companies, consumers would certainly have to pay more for their supplies, and would not get relief from rates.

Other Criticisms Answered

The elusive critic, when faced with the fact that profits result from municipal trading, begins generally by asserting that the accounts are not correct and speaks recklessly about "financial juggling." The accounts of municipalities are published, all information can be obtained by any citizen, the accounts are audited by two elective auditors in every city, by an auditor appointed by the Empire, and in all large towns and cities they are again audited by professional accountants. In the case of county councils and district councils, accounts are subject to audit by the Local Government Board. The members and officials of municipalities have no object in misrepresenting the financial result of the undertakings, and when we remember that behind all the checks and audits mentioned, there is the force of public opinion, it is absurd to insinuate that the accounts are "crooked."

Then the critic generally takes another position. He says that municipalities have no business to make any profit at all. It is very immoral of them to do so. Most of the critics who have recently advanced such opinions are animated, not by a desire to see the price of public utilities reduced to the consumer, but by the hope that the adoption of this system may occasionally lead to balances on the wrong side and thereby help to discredit municipal ownership. As a matter of fact, the policy of establishing municipal undertakings for the social benefits which they bring is preferable to that of carrying them on for the pecuniary relief afforded to local taxpayers.

Source of Attacks

The recent attacks on municipal ownership in England have been led or stimulated by people who are directly interested in large combines. Societies have been started for propagandist purposes by these companies, and they are ever ready to subsidize local ratepayers' associations, to run candidates for municipal elections and carry on agitations in the local press. For instance, an organization called the Industrial Freedom League was recently started by the directors of a large electric combine. They frankly acknowledge that they started this organization to protect their own and kindred interests. They are receiving a certain amount of support from others who have a genuine fear of the spread of municipal ownership. Among the members of the council of this organization is the Hon. Robert P. Porter, who has been one of the speakers on behalf of the League. Mr. Porter's reputation as an impartial critic of municipal matters was very seriously impaired by his intervention in a heated local campaign in Birmingham, where he went to speak in support of an electric combine which was trying to force the municipality to hand over its franchise in street railways. The civic spirit of Birmingham asserted itself on that occasion, and the company, notwithstanding its vigorous campaign to convert public opinion to its side, was ignominiously defeated.

Another system adopted by the Industrial Freedom League to attack municipal ownership has been by means of articles presented to provincial journals, and letters inserted in the local press, which have been paid for at so much per line. The activity of companies advocating their interests in these and other ways might lead to far greater dangers to public life than can possibly accompany municipal ownership. Fortunately, in English cities company interests have been kept well under control. The opportunities for temptation have been narrow, the way has been easy for honest government. Leading business men in each community have come forward to serve on city councils. They have been ready to sacrifice their time and their ability without any ulterior motive whatever. The officials are selected and promoted

according to merit. They are a permanent civil service. They are not over-well paid, but as a class their honesty and integrity are unquestioned. It is this absence of motive on the part of city councillors, and the integrity of the officials, which makes it easy for municipalities in England to develop successfully municipal ownership.

Several years ago a Parliamentary investigation was begun into municipal trading, and it is probable that the inquiry will be resumed. The commissioners found themselves in difficulty in drawing up any recommendations. They could not deprive the towns of their gas, electric, tramway and other undertakings already established; they could not suggest that other towns should be prevented from establishing the same undertakings, nor could they draw up any hard and fast rule as to the limit of municipal ownership. Many recent developments have been forced on municipalities by the Government, such as the housing of the working classes, the establishment of municipal telephones—which few municipalities sought—and although it is only optional for them to establish services, the opportunity for doing so was given them by the Government. Only last session an act was passed allowing municipalities to erect crematoria. It is therefore impossible for the legislature to place any finalty on municipality development. While the Commission may not lead to any practical result the supporters of municipal ownership welcome investigation. They believe that the more closely the results of municipal ownership are inquired into and judged, not only from a commercial standpoint, but from the wider point of view of general utility, the advantages to the community will be more and more apparent.

Municipalization a Success

The result of the municipalization of the gas and water undertakings has unquestionably been lower charges. The same is shown in the case of electric light. The average price charged, for instance, is more than 1d. per unit, or thousand watts, lower by municipalities than by companies. The benefits of the municipalization of the street railways—the latest development in municipal ownership—are now recognized. But public authorities have not done all their duty by showing that they can manage undertakings profitably and cheaply. Their chief aim should be to raise the standard of comfort, to improve the social and moral condition of the people they govern. Municipalities, for instance, must be model employers. They need not seek to surpass the best standard, but they should not fall below it.

One of the dangers seen in municipal progress is said to be in the large increase of employees it involves. These employees, however, have various interests and are never likely to act as a unit. Their influence in local elections is not yet great, as they do not all live within the town in which they work. Should they become extravagant in their demands, or otherwise try to exploit the governing authority, there would be a reaction from which they would be the first to suffer.

There are other aspects of a forward municipal policy. There is the splendid stimulus which it gives to good citizenship. We see that in the rejoicings that take place in the opening of municipal street railways. The people feel that the cars are their cars, that it is the duty of the community to support their communal service. There is the feeling of corporate responsibility for the welfare of all classes. This spirit, which calls for self-sacrifice on the part of those who serve the public, leads to a greater progress in the sanitary and intellectual needs of the people. There is in every city, as the results of municipal work, a social and moral balance sheet which cannot be represented in figures, but the effect of which is enjoyed by all in the lives saved from disease, in a higher standard of living, and in an amelioration of the social conditions of the whole community.

Origin of the Tramway Act of 1870

Although an Englishman, Outram, laid down the first plate or street railway, and, as is commonly supposed, gave the latter part of his name to the first part of "tramway," no attempt was made to introduce street railways into England until George Francis Train tried his experiments in Birkenhead and London. Street railways had existed in America many years before this time. English business men took no interest in tramways. Tramways were looked upon as a means of obstructing traffic, not of relieving it, and it was not until 1869 that any serious attempt was made by companies to promote tramway schemes. A few acts, giving powers to run tramways, were obtained before Parliament passed the general Tramways Act of 1870, which was introduced on the initiative of the Government with the intention of facilitating the construction and regulation. It is well to recall the conditions under which this act was passed and the practice which it established, as it is now frequently stated that the development of street railways in Great Britain was delayed and discouraged by municipal action and that the Tramways Act of 1870 penalized private enterprise.

The Metropolitan Board of Works, the central municipal authority of London, which preceded the County Council and was an indirectly elected and thoroughly conservative body, gave the following summary of tramway development in its last report—for the year 1888:

"The first applications to Parliament for power to lay down tramways were made in the year 1869. Seven or eight years earlier experimental tramways had been laid down, with the sanction of the road authorities, in Bayswater Road and in the Westminster and Kennington roads, by Mr. G. F. Train, a citizen of the United States, but these tramways were found to be inconvenient to the general traffic and had to be removed. In 1869 several schemes were brought forward for tramways in different parts of London, and it was necessary for the Board to consider the important question whether and to what extent it was right to concede to trading companies powers over the public thoroughfares. The Board came to the conclusion that as tramways would facilitate locomotion and would therefore be a great convenience to large numbers of people, they should not be needlessly impeded, but rather that all proper facilities should be granted for their introduction into London. It was thought, however, that it would be well, before sanctioning any large scheme, to try the system fairly in two or three of the main thoroughfares and thus gain experience as to its advantages and disadvantages, and the best means of obviating any difficulties which might arise. The Board appeared before the select committee of the House of Commons, to which the bills were referred; and the committee, after hearing evidence on both sides, virtually adopted the Board's views. Three acts of Parliament were accordingly passed, each sanctioning the laying of a tramway. In the following year, 1870, five more bills were introduced, three of them by the companies which had obtained powers in the previous year; and the Board of Trade, perceiving that the formation of tramways in London and other large towns was about to become general and popular, resolved to prepare and lay before Parliament a general bill to facilitate the construction and regulate the working of tramways in Great Britain.

"The main object of the measure, which after due inquiry became a law, was to provide a simple, inexpensive and uniform mode of proceeding in obtaining authority for the construction of tramways, to give the local authorities the power of regulation and control, and to avoid the necessity of a Parliamentary investigation in each case."

This Act of 1870 empowered any municipality to obtain provisional orders and lay down tramways. A negative provision about municipal operation was two years later turned into a positive prohibition by a standing order of the House of Commons; not, however, before one or two towns had obtained private acts enabling them to operate as well as own tramways.

It should be noticed that the main object of the Tramways Act and of subsequent parliamentary proceedings was to lay down the fundamental principle that municipalities should maintain control over the public streets, that there should be no trafficking in franchises, no creator of good-will in street railways. After a few years' working of the act—in 1879—a committee of the House of Lords inquired into the subject in order to see what new regulations should be imposed. This committee was strongly of opinion that "it is most desirable that tramways, especially in towns, should be constructed and maintained, though not worked, by the local authorities." This principle was never questioned until a deputation of tramway company directors waited upon Prof. Bryce, when President of the Board of Trade in 1894, asking him to maintain the embargo against municipal working and to give the tramway companies, when the twenty-one years' limit was up, a claim to lease them. Mr. Bryce would not depart from the principle laid down in the act. He said:

"It would be argued strongly that the municipalities existed for the sake of the public; and if they worked the lines they would do so to

give the greatest public benefit, and that the Board of Trade would be injuring the public if it endeavored to vary the bargain already made against the municipalities in the interests of the shareholders."

Operations Under the Act

The Act of 1870 contains regulations about the width between rails, maintenance of roads and other matters. The crucial clause, so far as companies are concerned, is that, provided a municipality does not itself construct the lines, any company, on obtaining consent of the local authority or the consent of two-thirds of the governing authorities should the lines cover more than one governmental area, is obliged to sell the undertaking at the end of twenty-one years on the municipality paying the value of the plant, material and works, exclusive of any allowance for past or future profits or any compensation for compulsory sale. The companies were perfectly aware of these conditions when they obtained the privileges, and, as a matter of fact, for the first few years they began underwriting their works and set aside a fund to redeem the difference in the capital expenditure between what the works cost and what the municipalities would pay. They afterward discontinued this system, in the hope, probably, of getting the law altered.

A few municipalities constructed their own tramways. These were Glasgow, Birmingham, Bristol, Manchester, Salford and one or two other towns. There was no great desire shown by companies to introduce tramways. This lack of enterprise was due to the natural conservatism of business men or else because they were interested in other matters (at that time British manufactures had reached their highest stage of prosperity). The omnibus, it is thought, quite satisfied the rapid transit needs of the time. It was the failure of the omnibus companies in Birmingham that induced the corporation in 1870, as soon as the act was passed, to obtain the right to lay down tramways and to lease them to companies. Only two lines were constructed then and opened in 1873. The lines in Glasgow were laid in 1870. During the next five years little progress was made. The following statistics show the comparatively slow growth of tramway enterprise from 1876—the first year in which the Board of Trade made returns—to 1890, when electric traction began to make its appearance. The returns of earnings and operating expenses are not given until 1878:

	No. of Undertakings.	Mileage Const'd.	Capital Expended. £	Gross Receipts. £	Net Receipts. £	Passengers Carried.
*1875-6	44	161½	2,253,121	.....	.....	.....
*1876-7	46	214	3,343,265	.....	.....	.....
1877-8	60	269	4,207,350	1,145,465	230,956	140,001,223
1878-9	76	321¼	4,861,847	1,192,347	193,040	150,881,551
1879-80	99	368	5,665,465	1,342,933	229,839	173,067,103
1884-5	155	811	11,067,629	2,613,438	637,859	367,702,307
1889-90	158	948¼	13,735,769	3,214,743	811,943	526,369,328

In 1890 the new progressive municipal movement began to take effect, and development was more rapid, so that, instead of retarding progress, municipalities have stimulated it, as the following statistics show:

	No. of Undertakings.	Mileage Const'd.	Capital Expended. £	Gross Receipts. £	Net Receipts. £	Passengers Carried.
1890-1	158	963¼	14,162,650	3,429,686	798,757	565,621,478
1894-5	154	982¾	14,956,343	3,733,690	855,201	661,760,461
1898-9	169	1,122	18,603,222	4,879,602	1,204,043	924,820,247
1900-1	213	1,305½	26,799,023	5,961,062	1,435,883	1,198,226,758

* Returns for these two years not issued by Board of Trade.

† Those *owned* by municipalities; some are *operated* by private companies.

Municipal Activity

The following table shows the comparative growth of municipal and company undertakings:

	Municipalities.†			Companies.		
	No.	Capital Expended.	Mileage.	No.	Capital Expended.	Mileage.
1882-3	28	£2,227,192	170½	113	£7,523,635	501
1888-9	29	2,959,633	243¼	125	10,704,958	706¼
1892-3	35	3,105,636	274¼	118	10,998,516	686½
1896-7	42	4,459,488	367¾	117	10,405,622	663½
1897-8	47	6,116,687	450	116	10,376,282	614
1898-9	61	8,134,530	519½	108	10,468,692	602½
1899-1900	70	10,203,604	584¾	107	11,532,284	592¼
1900-1	99	14,057,664	689½	114	12,741,359	616

While public bodies, at the end of that year (March, 1901), operated only 27 per cent. of the total undertakings, they earned 43 per cent. of the aggregate net revenue and carried 46 per cent. of the total number of passengers conveyed. Since 1901 the greatest development in municipal tramways has taken place, while many of the companies figuring in the above returns have been expropriated.

Almost all the large cities not only own but operate their own tramways. The London County Council is now operating 72½ miles of lines; it is building, or has prepared plans for constructing, over 100 miles of lines; it owns and leases 42 miles north of the Thames. Glasgow municipality owns and operates 103½ miles within the city and in the suburbs. Liverpool has 900 miles. Manchester is building a system to the same extent. Bradford, Leeds, Huddersfield, Sheffield, Newcastle, Dundee, Aberdeen and others now own and operate municipal tramways Bristol—where a company operates—, Edinburgh—where the lines are owned by the city but operated by a company—, and Birmingham—where the time for municipalization and working has only just arrived—, are the principal exceptions. In England and Scotland, therefore, companies are, with these exceptions, confined to the smaller towns, and even many of these, such as Dover (population of 41,782), Ayr (population 28,624), Wallasey (population 53,580) and Yarmouth (population 51,250) have successful municipal undertakings.

Private Undertakings Successful

The tables upon the preceding pages, combined with the following

	Ratio working expenses and receipts. Per cent.	Net revenue per mile. £	Return on capital exp. Per cent.
1877-8	75	858	5½
1878-9	83	601	4
1879-80	82	624	4
1884-5	75	786	5¼
1889-90	74	856	5¾
1890-1	76	829	5½
1894-5	77	870	5¾
1898-9	75	1,073	6½
1900-1	76	1,100	5¼

show that company undertakings have yielded a fair return. Good dividends have been paid whether the municipality constructed the lines as in Manchester, Glasgow and Birmingham, or whether the companies have been allowed the free use of the streets during the currency of their franchise, as in London and other cities. The Dundee Tramways Company was paying 12½ per cent. when it was acquired, the Manchester company 10 per cent., the Leicester company 5 per cent., the Glasgow company 10 per cent., the London company 10 per cent.

(To be continued.)

DEPARTMENT OF PUBLIC WORKS POORLY EQUIPPED

In contrasting the conditions of the streets of New Orleans with those in Detroit in point of pavement and cleanliness, Mr. B. F. Emory, formed street cleaning superintendent of the latter city, found much to be done in the "Crescent City." The department of public works was illy equipped to do the same work that was asked of it and could not be blamed for the condition into which the streets had fallen. There were no sweepers or street sprinklers in the department when Mr. Emory visited New Orleans and the appropriation for the maintenance of the streets was lacking. There were no road scrapers or rollers and he considers it "the poorest economy in the world not to have these supplied." Detroit has ten large sprinklers, sixteen two-horse street sweepers, two ten-ton rollers and eight graders. Mr. Emory recommended that New Orleans purchase a number of hand street sweepers for use on the asphalt streets, for by their use the pavement can be kept clean at small expense. The Health Board of the city has been endeavoring to install a regular garbage collection to do away with the nuisance attending the unsatisfactory service long in use.

The experiment of laying asphalt over the gravel streets has been tried and the heaviest traffic turned onto the streets thus treated to test the wearing qualities of the pavement. Thus far the paving has stood the test very well.

KREODONE WOOD-BLOCK PAVEMENTS

Paving Conditions in Chicago—The Old Wood Pavements a Failure—Remarkable Wearing Qualities of the New Wood Pavements—Methods of Treating the Block

By Frank W. Moulton

THE subject of street paving is everywhere and all the time a most important one. For ages, profound thought has been devoted to it in European cities with the evident desire to evolve the perfect pavement—but the perfect pavement has not yet been found. In Paris, London, Berlin and other European capitals there are still great diversities of opinion, every kind of pavement has been experimented with to a greater or less extent, and although in some cities one pavement will be looked upon as possessing a greater number of good features than any other yet in another city, where perhaps as much thought and care have been devoted to the subject, an entirely different type of pavement will seem to have the preference.

So it is in the cities of this country. It cannot, however, be said that there has always been an honest endeavor on the part of city engineers, boards of local improvements and others to make use of the pavement possessing the greatest number of strong points and the least number of weak points. The question of expediency has sometimes governed in the selection, and more frequently a subtle and unseen influence has had great weight and resulted in the laying of miles of pavements of various kinds which required repairing almost as soon as the last square yard had been put down.

CHEAP PAVEMENTS IN CHICAGO

Although a layman, I have been for years an interested and sometimes amused spectator of conditions as they have existed in Chicago. Partly as the result of the marvelous growth of the city, cheap pavements have been extensively laid—seemingly as mere makeshifts. The question of durability—possibly the most important question to be considered—has apparently been lost sight of altogether. Miles of streets have been paved with cedar blocks, cut to a great extent from dead trees from the burned-over forests of Wisconsin.

Some pavements commence to deteriorate as soon as they are laid. These cedar block pavements had, in quality, begun to deteriorate before they were laid. Placed on board foundations they naturally would not have lasted very long under heavy traffic even had the cedar blocks been at the outset of the best quality.

Granite blocks have been extensively laid in the heavily trafficked streets of the business section. Their surfaces are rough, and the rumble and roar of traffic in a city of two million inhabitants can better be imagined than described. Some of the best known specialists in nervous diseases have repeatedly declared that the continuous noise resulting from the passing of traffic over these granite block streets is a direct cause of numerous nervous disorders. Besides, the interstices between the blocks have served as receptacles for dirt and filth and the breeding places of disease germs.

Asphalt pavements have, during the past few years, been quite extensively laid. But where there is any considerable traffic they seem to be in constant need of repair. In addition to lack of durability, the asphalt pavement, to my mind, also lacks two most essential features: It does not afford a secure foothold for horses drawing heavy loads, and on a residence street where the horses are generally proceeding at a more rapid gait than a walk, the clatter of the horses' hoofs is annoying. It is, however, a smooth pavement when first laid, and pleasing to the eye.

Macadam, which is dusty when dry and muddy when wet, is quite extensively used in certain of the residence districts. On some of the boulevards, especially those under the control of the South Park commissioners where it receives constant attention both as regards repairing and sprinkling, it is a good pavement—especially for the horse.

I come now to what is, in the minds of many competent judges, the most nearly perfect of all the pavements which have thus far been laid in Europe or in this country. I refer to the Kreodone wood-block pavement, as it has been laid on the Rush Street bridge and in Michigan Boulevard in Chicago, and in some of the streets of Indianapolis and other cities.

Rush Street bridge is, without doubt, the most heavily trafficked bridge in the United States. A very fair estimate would place the number of vehicles passing over it daily at 11,000. This estimate is certainly below rather than above the true number. It should be understood, too, that most of these vehicles are drays and trucks of the heaviest character.

KREODONE BLOCK PAVEMENT, DELAWARE STREET, INDIANAPOLIS

Prior to October, 1899, this bridge had been paved, time after time, with untreated rectangular wood blocks. The Kreodone treatment of wood blocks having been brought to the attention of the city engineer, several representatives of the city visited Indianapolis for the purpose of inspecting the Kreodone block pavements in that city. Upon their return their report was favorable, and the city decided to pave one-half the bridge with Kreodone-treated yellow pine blocks, and the other half with untreated blocks. This was done as an experiment, as it was desired to test practically the Kreodone pavement and ascertain if it would last under the enormous traffic which passes over the Rush Street bridge. It should also be stated that the Kreodone-treated blocks were laid under a 10-year guarantee.

REMARKABLE DURABILITY OF WOOD DEMONSTRATED

I examined both the untreated and the Kreodone blocks a short time ago, and found that the untreated had worn from one to two inches, and unevenly, while in the case of the Kreodone-treated blocks no wear was perceptible—in fact they appeared to be just as perfect as when first laid.

Since the pavement was laid in October, 1899, not a single block has been replaced nor has the pavement required repairing in any particular.

I have wondered what other pavement could show the same excellent results under the same or similar conditions.

Mayor Harrison, in his annual message to the City Council, April 7, 1902, declared it advisable to introduce a more general competition in the paving market, and suggested that the Kreodone block pavement should be given a more extensive test. After referring to the paving of the Rush Street bridge, he said: "The traffic on this bridge is of the heaviest character, and the bridge being narrower than the street on both sides of it, and carrying all the light traffic of a large portion of the North Side in addition to the heavy traffic from the wholesale district, from the river docks and from the railroad freight houses, the paving is subjected to what is, in all probability, as severe and exacting a test as any single piece of paving is put to in Chicago."

One of the city's assistant engineers reported that he had examined the two kinds of pavements laid on the Rush Street bridge and found, "that the untreated pine block pavement shows a wear at some points of as much as two inches, while in the roadway paved with treated blocks the maximum wear seems to be about one-eighth of an inch, and is very uniform. I should say that the average wear between the two roadways is in favor of the treated block six to one, or an average wear of three-fourths of an inch in the common block and one-eighth of an inch in the treated block."

So much for the question of durability.

The Pavement Tried on Michigan

A short time after the pavement was laid on the Rush Street bridge it was decided by the South Park commissioners to lay, experimentally, a small section of Kreodone pavement on Michigan Boulevard. Eleven hundred yards of Kreodone pavement were accordingly laid in front of the Auditorium Hotel in Michigan Boulevard, between Congress and Van Buren streets. In a letter dated August 15, 1902, Mr. J. F. Foster, general superintendent and engineer of the South Park board of commissioners, said that the pavement was a "most excellent specimen of wooden block pavement. It is practically in as good condition to-day as it was when it was laid, although the traffic on this part of Michigan Boulevard is very great. No repairs have been made on it, and nearly every one with whom I have talked concerning it is greatly surprised to learn that it is in such excellent condition."

On close inspection I find this piece of pavement in as perfect condition as when first laid. The eleven hundred square yards of 5-inch long-leaf yellow pine blocks here referred to were laid on a seven or eight inch cement-concrete foundation. Considering the fact that the pavement cannot decay, I think I may safely predict that it will be in serviceable condition fifty years hence. It is probably the most nearly perfect piece of pavement ever laid.

*Kreodone is a direct result of a series of experiments extending over a period of years. Kreodone is a fixed oil, and absolutely uniform in quality. Once in the wood it remains there forever.

Creosote oil at 130 F. will frequently lose almost 60 per cent. of its bulk owing to its volatility. The tar acids in the Kreodone are fixed and will not volatilize at that temperature. For the treating of wood blocks, shingles, railroad ties, etc., Kreodone is the only oil manufactured that is absolutely non-volatile.

How the Wood Is Treated

In the treating of wood with Kreodone the same process is followed is in the case of ordinary creosoting. Wood paving blocks, for instance, are first placed loosely in iron cages which are on wheels and are run into a large steel cylinder which is then hermetically sealed. This cylinder is lined with steam pipes and connected with vacuum and oil pumps. The blocks are gradually heated to a point where the sap, albumen, starch, etc., in the wood are vaporized. The vacuum pump is kept in operation removing these materials as fast as the the heat transforms them into vapor. Then the Kreodone oil heated to 150 F. is turned into the cylinder, and pressure from the oil pump is applied until at least ten pounds (1⅛ gallons) of the oil penetrates each cubic foot of the wood. The surplus Kreodone is then drawn off, and the blocks when cool and dry are ready to be laid in the street.

KREODONE BLOCK PAVEMENT, FRONT OF AUDITORIUM HOTEL, CHICAGO

Let us now for a moment consider how nearly the Kreodone pavement approaches the perfect pavement. Probably the first thing to be considered is durability. In addition to what has already been said relative to the durability of the Kreodone pavement laid in Chicago it should not be overlooked that a great deal of the same kind of pavement has been laid in Indianapolis—the first of which was laid about seven years ago. None of this pavement has yet required repairing, even the slightest degree; and it is not likely that any of it will have to be repaired for many years to come.

The perfect pavement should be noiseless. The Kreodone wood block pavement is more nearly noiseless than any other pavement.

Furthermore, the Kreodone pavement will not decay. Kreodone remains fixed in the wood and moisture cannot enter.

It is probably the most easily cleaned of all pavements, and when it is kept in a clean condition it does not require sprinkling.

The fact that it is a sanitary pavement should not be overlooked. In these days of disease germs and microbes the Kreodone pavement will come as a blessing. Kreodone, considering its constituent qualities, might be sold as germicide, and any man should consider himself fortunate in having a Kreodone pavement in front of his house. Kreodone pavements breed good health.

* There may be some who are not entirely familiar with Kreodone as a wood preservative. Kreodone, in a word, is a modified form of and a distinct improvement on creosote oil. It it made by the Republic Chemical & Creosoting Company of Indianapolis, Ind. These people, after many years' experience in the making of creosote oil and in the treating of paving blocks, railroad ties, bridge timbers, etc., concluded that it did not entirely serve the purposes intended because of its volatility and lack of uniformity in quality. In the case of wood pavements the use of a volatile oil meant in a degree spongy pavements and a consequent bulging after a limited period. Being a product of tar, creosote oil varies in quality, according to the quality of the coal from which the tar is extracted and the manner in which it is extracted.

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The New York Telephone

The telephone service in New York is very good but very costly. The company is in business for dividends and it gets them. Years ago it was shown that the telephones were yielding an average of eighty per cent. a year on the old company's investment, and some years as high as one hundred and forty-five per cent.; yet the Company raised the rates, first sixty dollars, then one hundred and fifty dollars, then one hundred and eighty. The rate for direct unlimited service now is two hundred and forty dollars with measured service to match; seventy-five dollars for six hundred calls, with eight cents for each added call, to two hundred and twenty-eight dollars for four thousand five hundred calls, with five cents for each call in addition, a scale that works out more than two hundred and forty dollars a year for a large business house and the company is refusing to make any more two hundred and forty dollar contracts.

Independent experts of high character and ample experience estimate that two-thirds of the receipts must be profit, and that rates of eighty-five dollars to one hundred dollars for direct unlimited service would be sufficient in New York. Operation and maintenance should not cost over fifty or sixty dollars a line, and investment two hundred and fifty, or three hundred dollars at the outside, excluding *legislative expenses*, which should not be paid and are entitled to little or no consideration, being largely in violation of either the letter or the spirit of the law, and excluding also the subways, which in New York are in the hands of another company, the duct rentals being included in operating cost. At five per cent. interest and five per cent. for a sinking fund to cover depreciation, which would be ample for a well kept plant, an average total of ninety dollars would be indicated.

The Independents have cut Bell rates in two in a number of cities—Rochester, Cleveland, Indianapolis, Philadelphia, for example,—and the managers assure me that the profits are entirely satisfactory. Some independent plants have not succeeded, having insufficient capital or inadequate management, and some were built on purpose to be bought off by the Bell; but where carefully built, with sufficient capital behind them, and experienced management, they have made money on half the Bell rates. Some of them would be glad to do the same thing in New York City if they could get the needful rights of way at fair cost. But the duct company appears to be interlocked with Bell interests and will only assign roundabout routes which would make the new lines impracticable.

Co-operation, or public ownership, would be able to make still lower rates than any corporation bent on dividends. A co-operative plant in Grand Rapids, Mich., is giving the people telephone service at one-third of the former rates which the Bell folks said they could not afford to reduce. The United States Government, in 1895, put in a number of telephones to conect some of the public buildings in Washington and got a telephone service for one-seventh the former cost with the Bell 'phones. The Bell service in this case, however, was superior to that of the little lone exchange, and when the Bell consented to make reasonable rates for its service (less than one-third of its former rates which it is said it could not afford to lower) the Government went back to Bell 'phones.

In London, a Government exchange is operated on an eighty-five dollar (against one hundred dollar) direct unlimited rate; in Paris, eighty dollars (against one hundred and twenty dollars); in Berlin, sixteen to forty-five dollars; in Glasgow, twenty-seven dollars (against fifty dollars)—the rates in parenthesis being those charged by the private companies at the time the Government came into the field. With present methods of operation, the rates in New York, could not be as low as in Berlin or Glasgow, but they could be much lower than they are. Public, or co-operative ownership, or independent competition, does not reduce rates to the same level in different countries or cities, but they always reduce rates below those established by a private monopoly in the same place.

For public ownership, however, New York City must first get full and permanent possession of her Government. So long as there is danger that the city government may again be used by any gang of politicians for their private aggrandizement, to municipalize the telephone might be to just put it in the hands of a far worse set of private monopolists than those at present in control of it. They are as fine a set of men, as far as I know, as can be found. If a private telephone monopoly is to exist I have nothing against the Bell, except that its rates are twice as high as a reasonable private monopoly would make, and its capital too much watered, and its actual cost of operation kept too secret. With all its faults it is infinitely preferable to a direct Tammany management. This, however, is no argument against public ownership of the telephone; it is only an argument for the permanent purification of the city government.

I have said that with present methods the rates in New York could not be as low at the existing Berlin rates. But two inventions in the telephone world are knocking for admission to our cities,—the Rogers system with the Faller automatic switchboard. These are being introduced in Canada with the result of cutting rates to ten and five dollars a year in place of Bell charges of twenty-five and forty-five dollars, and it is thought would justify a thirty dollar rate even in New York,—the cost of the new system being very little greater in a large plant than in a small one.

Another expert, who has given much attention to the subject, thinks a system of 400,000 telephones could be laid out in Greater New York, putting a telephone in every house and business place where they would receive it, making no charge except two cents for each outward call,—a rate he thinks would yield about forty dollars a year, which he says would be sufficient, and he has the detailed estimates of cost to prove it. A part of this system would be a "clearing house" to which all inter-exchange messages would go instead of requiring cross trunks to all the others.

It is clear that the telephone situation in New York is one that needs the attention of her citizens when they get some of their heavier chores done.

Frank Parsons.

The Asphalt Trust

ELSEWHERE in this issue will be found a summary of the accounting of Mr. Henry Tatnall and Mr. John M. Mack, receivers for the Asphalt Trust of America and the National Asphalt Company, filed by them in the United States Circuit Court at Trenton, N. J., on March 18th, and published in the New York *Herald* on March 19th. It is interesting matter and its analysis will furnish our readers with ample evidence that the asphalt trust was one of the most gigantic frauds ever foisted on a credulous public.

Fifty companies, more or less, wrecked and driven out of business was the first result of the trust, and the present business methods of the Barber Asphalt Paving Company—which was, and is, the dominating factor in the trust—under the leadership of Mr. Mack, indicates a determination to extend its work until it runs every decent paving company—whether of asphalt, brick, wood or bitulithic—out of business, destroying all competition and again placing American cities at the mercy of its greed.

From its inception the trust methods have been fraudent, disreputable and heartless; fraudulent, because it practiced deceit in gaining its hold on some of the subsidiary companies and secured much of its capital under false pretenses; disreputable, because it has been charged with obtaining business by bribery and corruption, which charges it has never tried to refute; heartless, because it counted for naught the sacrifices and fidelity of the practical men in the business —those who had created and given to the asphalt industry its previous honest name—virtually casting them adrift by making it impossible for honest men to do business according to the methods of the trust, so that these men were obliged to get out or lose their self-respect.

Its aim was to kill and annihilate, placing the municipalities of the country at its mercy; and for a few short months it succeeded admirably. For a time it was a monarch of all it surveyed.

But it is a difficult thing to suppress, continuously, American enterprise, such as was found in the practical men the trust turned out in the cold. The trust thought them totally discouraged and silenced. Here was its fatal mistake. So soon as the vicious tactics of the trust were defined, these men began to build a new paving industry; some remaining in the asphalt field, others devoting their attention to wood and brick pavements, while still others sought to create an entirely new pavement. Without even a nominal pooling of their interests, by a common instinct, they stood as a unit against the trust. Thus they have succeeded in creating once more a formidable rival, so successful, indeed, as to excite the fear, hence the hatred of the asphalt trust.

Naturally enough, having its grip weakened by the collapse of its financial bubble and fearing lest it be permanently put out of business by other honorable asphalt paving companies and those laying other kinds of pavements, it is smirching its already bad name by the use of still more disreputable methods. This being the situation, we feel that, in justice to our readers and hundreds of municipalities, not to mention the honorable portion of the paving industry unconnected with the trust, we should now take an aggressive hand in the fight to suppress and destroy this common enemy. For this reason, we are ready to make every legitimate effort to further the interests of the honest asphalt companies, and those laying brick, wood, Medina stone, bitulithic, or any other kind of pavement, so long as they adhere to reputable methods. Any assistance from any source, which will enable us to make a stronger fight, will be heartily welcomed.

As a first note of warning we wish to call attention to the hypocritical tactics of the trust in New York and elsewhere. Some of the New York officials are claiming that the Low administration has broken the "asphalt ring," or trust, and are making political capital out of it. But, as a matter of fact, nothing is further from the truth. The prevailing low price for asphalt in New York is simply a trick to break down competition in that field and to weaken competition from other kinds of pavements. "So soon as the trust drives out the competing companies by low prices," said a high official who is connected with this administration and who is "too old a bird to be caught with chaff," "it will double, triple, and quadruple the present prices, here and elsewhere. Anyone who has even a superficial knowledge of the asphalt paving business knows that a first-class pavement cannot be laid at one dollar ten and one-half cents a square yard. It is so absurd that I wonder anyone is deceived."

This official speaks the truth, and we believe that this work will prove more expensive, by far, to the city, than the Broadway pavement with a fifteen-year guarantee at more than five dollars per square yard.

Another trick of the trust, resorted to in Cleveland and elsewhere, was to put in absurdly low bids for brick pavement. This gives a double advantage to Mr. Mack, for he will probably make a profit on the brick (he is a large paving brick manufacturer) which he will sell to the subsidiary asphalt company, in the trust, to which was awarded the contract for laying the brick pavement, and then, this company will probably make a poor job—that is what is feared by the paving brick manufacturers—thus designedly bringing brick pavements into disrepute. Similar tactics have been tried with the bitulithic pavement, but not with the success achieved in Cleveland.

For the foregoing reasons, we wish to appeal to the sense of justice of all municipal officials. Give a fair price to the contractor in order that he may pay a living wage to his employees, and be justified in laying the very best pavement possible.

Refuse to deal with the trust on any terms, as many cities have already done, notably in New York when the trust offered to lay a large portion of bitulithic pavement without cost to the city, the offer being unanimously rejected by the Board of Estimate and Apportionment on the ground that the trust could not be expected to properly lay this pavement when it was looked upon as one of its strongest competitors. A concern that has defrauded its stockholders to the extent of millions, one that has lost millions by bad management, cannot be trusted to do honest work for any city, even at fair prices, much less at prices below actual cost. It will be sure to get even in some way.

Beware of the trust! It has "done" others and will "do" you, if you give it a chance.

LATER.—Since the above was written, former Judge Robert S. Woodruff, who was appointed to ascertain the amount due in principal and interest on the outstanding collateral gold certificates of the Asphalt Company of America and the National Asphalt Company, filed his report in the United States Circuit Court, Trenton, N. J., March 27th, and, at the same time, recommended that the collateral deposited to guarantee the payment of said principal and interest be sold in bulk. Judge Woodruff finds that there is due in interest on the certificates of the Asphalt Company of America, the sum of $2,423,075.44, which, with the principal, makes a total indebtedness of $30,537,701.77. The collateral deposited was $3,000,000 of the capital stock and $3,000,000 in demand notes of the subsidiary company. Of this amount $185,000 was used on the occasion of the first default in interest. The principal and interest of the outstanding certificates of the National Asphalt Company aggregate $6,054,393.72. The collateral consists of 598,852 shares of the capital stock of the Asphalt Company of America.

Sturgis Charged with Violation of Law

OUR readers will not be surprised to learn that Fire Commissioner Sturgis of New York has gotten himself into trouble by violating the law, as charged by Comptroller Grout. Mr. Grout recently wrote to Mayor Low, accusing the Fire Commissioner of violating the law which provides that contracts for public work costing more than one thousand dollars shall be let only after competitive bids have been advertised for. The Comptroller has been investigating the disposition of an unexpended balance of $34,000 on repairs and improvements for fire houses in Brooklyn. He found that instead of advertising for bids when work of the same nature was to be done in several fire houses, a separate contract was made for each house. Although the cost of the work on no one fire house exceeded the one thousand dollar limit, yet in the aggregate a large outlay was authorized, which, says the Comptroller, should have been awarded in one contract by public bidding. Several contracts, less than one thousand dollars each, but reaching a total of several thousand dollars, were given to one firm.

The Mayor sent a letter to the Fire Commissioner asking for an explanation, whereupon the Commissioner defends himself by saying that he only followed precedent and that the Comptroller was equally

responsible because his department sanctioned transactions of the same nature. Comptroller Grout replied to this counter charge by saying.

"Mr. Sturgis takes a wrong stand. I have no power to withhold payments of bills incurred by responsible city officials. I have repeatedly drawn the Commissioner's attention to the fact that he was violating the Charter."

The Comptroller has been quoted as saying that he would ask the Mayor to remove the Commissioner. This episode simply furnishes another bit of evidence corroborating the charge made at the time, that Mr. Sturgis removed Chief Croker on partisan and technical grounds. In all the investigation of Chief Croker and his connection with the fire department there was nothing discovered which would warrant the action taken in his case, as this calls for the dismissal of the present Fire Commissioner; but as Mr. Low upheld the Commissioner before, it is quite likely that he will not call for his resignation at this time even though it be well deserved. We look upon this incident as simply additional evidence vindicating Chief Croker.

LATER.—Since the above was put into type, Comptroller Grout, in a letter to Mayor Low, has asked for the removal of Fire Commissioner Sturgis for alleged derelictions in connection with engine house repairs in Brooklyn. He said that the Commissioner had committed an indictable offense, and that the Commissioner had awarded contracts irregularly after Corporation Counsel Rives had sent him an opinion forbidding it. In conclusion the Comptroller says:

"I am glad to be able to say that no other commissioner has required such warnings or been so persistent in continuing the old practices of administration in this city in the violation of this law. In this respect the Fire Commissioner stands alone.

"It is perhaps needless, however, to have gone so fully into these facts, since the action of the Commissioner of January 21, 1903, three weeks after the Corporation Counsel's opinion, and the undoubted violation of its terms, are sufficient to justify, it seems to me, quite as rigorous an application of the penalties of the law against him as he, as judge, administered to the fire chief whom he recently removed from office. I have only to add that it seems to my judgment that no different measure of judgment, in cases like this, should be applied to a member of this administration than that which would be applied to a member of another administration."

No Strap Hangers in Berlin

IN striking contrast to the custom prevailing in every large American city, street car passengers in England and on the Continent are not obliged to put up with the inconvenience of hanging to a strap in riding to and from their business. If Americans were suddenly permitted to enjoy the transportation privileges found in these well regulated cities they would more than likely think themselves suddenly transported to some Utopia. The strangest part of the situation is that the managers and stockholders of our transportation companies are constantly crying poverty and lack of profit in doing business in American cities. Abroad everyone is given a seat, and there is no rush hour in which a passenger on a surface or elevated line fails to get a seat; besides, the street railroad companies are obliged to pay large sums of money annually for the privileges they enjoy and yet the companies declare good sized dividends and no one hears any grumbling from the stockholders as to their poor paying investments. The managers of American systems must be excessively stupid, if we are to believe their statements, as they make every car in the service during rush hours perform more than double service. We think, however, that the stupidity is on the part of the public in submitting to the crowded condition of the cars even during rush hours. "Where there is a will there is a way," and necessity has always been the mother of invention. Therefore we confidently believe that if the public and municipal governments held out in a demand for a seat, even during the rush hours, the transportation companies would find some way to overcome the difficulties. For instance, if the regulations which govern Berlin street car traffic were enforced in this country the desired result would soon be attained, and without any loss to the transportation companies, but an untold gain to the comfort of the public. The regulations referred to are given by Consul General Mason as follows:

"I have to say that the regulation in Berlin forbidding the overcrowding of street railways is very simple and direct. It is simply a police regulation forbidding that a larger number of passengers shall be carried in an omnibus or street car than the number authorized. In every car there is posted conspicuously inside, the number of seats that it contains. The same is true of both the front and rear platforms, the number on the platforms being usually six. When all the seats are filled, no other passenger is allowed to enter the car. Standing in aisles or holding on to straps is not permitted. Similarly on the platforms, when six passengers have found places there, no one else is allowed to go.

"This regulation often separates a man and his wife, who are not allowed to return home by the same car, but it has the effect that there is no overcrowding and standing on each other's feet, or hanging by straps during the crowded hours of the day. The conductor and motormen are instructed to enforce this regulation and they do it without fear or favor. The conductor is in this country clothed with the authority of a policeman on board his car, and can put off any passenger who misbehaves. This is probably the meat of the whole matter. The conductor is a municipal officer within the prescribed limits of his duty."

EDITORIAL COMMENT

Three Thousand Employees Lose Their Jobs

PENNSYLVANIA cities continue to beat their own record for municipal corruption every little while. The latest example is located in Pittsburg and is shown in the following notice of dismissal recently sent to every employee of the city, from the heads of departments down to the scrubwoman, except those in the offices of the comptroller and the city clerk, which are not directly under the Recorder's power:

"Owing to the change in administration and consequent reorganization of the city employees, you are hereby notified that your services will not be required on and after April 1, 1903, unless you are otherwise notified. Respectfully yours,

"V. W. B. HAYS, *City Recorder.*"

The present Recorder was elected under the so-called reform administration. This looks like reform with a vengeance.

Atlanta Wants Street Construction Equipment

COMMISSIONER H. L. COLL'ER of the Department of Public Works, Atlanta, is making a vigorous effort to improve the streets and sidewalks of his city. To do this properly he sees the need of a well-equipped street constructing department. He estimates that, "A steam roller with four cars would deliver and distribute on a street in a day more than ten wagons and twenty-five men could deliver and distribute. These wagons are provided with wheels, the front wheels being 6 inches wide and the rear wheels 10 inches wide, so that both the roller and the wagons continually improve the streets over which the stone is hauled. These wagons do not eat in rainy weather. They save at least 60 per cent. on the cost of team hauling."

Philadelphia Enforces the Anti-Spitting Law

PHILADELPHIA just at present is much concerned about the enforcement of the anti-spitting law. The Traction Company is to be strongly commended for its vigorous and prompt attempt to enforce the ordinances recently passed by Councils making it a misdemeanor to expectorate in cars, public buildings, etc. The Company has conspicuously posted in all its cars the anti-spitting ordinance and has gone further than this and instructed its conductors to see that the law was properly enforced. The conductors on the street cars in Washington have been specially trained to do this work for some time. Recently the conductors on the surface cars in New York have been furnished with small cards with the admonition, "Please do not spit on the floor," which they are expected to hand to all offenders. It is a nauseous habit and is continued more from thoughtlessness than otherwise; it only needs a few examples and wide publicity to be stopped. The anti-spitting ordinance is one which all health authorities should be particular in enforcing.

Public Should Help Keep These Streets Clean

"CLEANLINESS is next to godliness," and the general public should be made to realize that this applies to the streets as well as their own homes. Very few people would consider it their right, even within the sacred precincts of their own homes, to throw a newspaper, scraps of paper or fruit peels upon the floor, and they should be made to feel that they have as little right to throw them promiscuously upon the street, as it costs cities large sums, annually, to pick up this refuse matter and dispose of it. The municipal governments, however, have more to do than enforce prohibitive regulations in this regard; it is the duty of the municipal governments to have refuse receptacles distributed along all streets at convenient intervals, duly marked and easy of access. We urge upon the street cleaning authorities in every city the wisdom of making these necessary provisions. With a liberal supply of refuse cans it would take but small effort on the part of the general public and the co-operation of the press to educate the people to use them.

The Fight for Water Meters in Norfolk

FOR a year or two City Engineer W. T. Brooke, of Norfolk, Va., has been making strenuous efforts to check and prevent water waste in his city, as there has been considerable anxiety felt over the probable necessity for increasing the supply. Mr. Brooke has contended that an increase in the supply would not be needed for many years if proper steps were taken to check the large waste of water now permitted. He has shown repeatedly, through the press and otherwise, how beneficial a general installation of meters would be to the water department. The matter has been warmly discussed in the Common Council, but the recommendations of Mr. Brooke have not been heeded. Luckily for the city, Mr. Brooke is not easily discouraged and is now pushing the agitation for an improvement of the distributing system and general installation of meters. It is to be hoped that he will be successful. We know of no municipality, either North or South, where the installation of meters on domestic taps will result in so great a saving.

Municipal Elections in the West

FOUR western cities will hold municipal elections this month, Chicago, St. Louis, Cleveland and Cincinnati. In St. Louis the election will be for members of the Municipal Assembly and in the other three for Mayor. The Democrats have nominated Mayor Carter H. Harrison for a fourth term, while the Republicans have put in opposition Graeme Stewart. The former was unanimously renominated while the latter was chosen only after a bitter and protracted primary fight. There is little doubt about the re-election of Mr. Harrison.

In St. Louis there is not the anxiety there once was to be elected to membership in the Municipal Assembly, owing to the activity of Circuit Attorney Folk, who has succeeded so admirably in providing crooked members of the Assembly with board and lodging at the expense of the State, in the penitentiary for a period of years. The influence of his campaign has purified the political atmosphere to a large extent, and it is expected that better men will be elected to fill vacancies, than for many years.

Tom L. Johnson has been renominated for the mayoralty in Cleveland and will be a hard man to beat, although his opponent, Harvey Goulder, is a Republican who is exceedingly popular with both sides. Tom Johnson is likely to be a winner because he is looked upon as the champion of the working classes and is a free spender of money for public interests. He is regarded by most of his enemies as sincere and has gained a large following by espousing the cause of tax reform and municipal ownership.

The most mixed up political situation in the four cities is that found in Cincinnati. In opposition to Julius Fleischmann, who has been renominated by the Republicans, the Democrats have selected Melvill E. Ingalls, president of the "Big Four" railroad. Mr. Fleischmann, who is a Hebrew, has made some unfortunate moves of late, in one of which he has succeeded in arousing intense antagonism on the part of all Catholics, and his administration has not met with the approval of the reform element, so that the Citizens' Organization has given its support to Mr. Ingalls. While Mr. Fleischmann is a machine man, and that is supposed to be almost invulnerable, it would not be surprising if, under the existing conditions, he were defeated.

No matter who is elected we may safely predict that the next administration in these various cities is bound to be better than its predecessors for the reason that public sentiment is constantly demanding more of its servants and continually raising the standard. The interest in municipal affairs is growing to such an extent as to make it dangerous for any prominent official to disregard public demands.

LETTERS TO THE EDITOR

Street Paving Specifications

KANSAS CITY, MO., March 10, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Kansas City is now engaged in a controversy to do her street paving under open specifications. I notice a number of interesting articles in THE MUNICIPAL JOURNAL, to some extent bearing upon this question. Will you kindly furnish me with the following additional information:

1. Which, among the important cities of the United States, still do their paving under what is termed "closed specifications?"

2. Can you cite me to cities which have proceeded under "closed specifications" and afterwards opened the same, with the result that there has been a decreased price in asphalt paving?

Broadly stated, I desire any information which is immediately accessible bearing upon this controversy.

JAMES A. REED, *Mayor.*

I do not know of any city in our country which does not now allow a considerable amount of competition in asphalt paving work. Experience has demonstrated that good pavements can be made with numerous kinds of bitumen, and that bad ones have often been made by the most zealous advocates of a particular variety of asphalt. Where competition in this class of paving prevails, the specifications are obviously quite general in character, so far as the "wearing surface" is concerned, the limitations being only as to the thickness thereof, and reliance being placed essentially in a long term guarantee of the pavement by the contractor. In some cases the contract or specifications contains the clause that all pavement shall be of "quality equal to genuine Trinidad lake asphalt," or some other kind, but this condition has practically little significance, as it is susceptible of two constructions, favorable and adverse, and hence its close interpretation has not been pressed.

To give a list of all the cities which allow competition in the direction named, is impracticable on such short notice, and I can only mention New York, Brooklyn, Boston, Syracuse, Rochester, Buffalo, Cleveland Columbus, Detroit, and Indianapolis. In fact, I do not know that any large city has now a "closed specification" for asphalt paving.

As to the cities that formerly proceeded under "closed specifications" and afterwards opened the same, it is probable that the list embraces most of our large communities. It must be remembered that twenty years ago asphalt pavements were rarely found in American cities, and that their construction was practically limited to two or three corporations which controlled the importation of bituminous material from foreign sources. Communities desirous of having such pavements were therefore obliged to proceed under the "closed specifications" of these corporations, but after satisfactory experience with competitive pavements was once gained, the bars were let down with the result that the cost was greatly reduced.—[ENGINEERING EDITOR.

Electric Lighting Statistics

————, La., March 3, 1903.

Editor, Municipal Journal and Engineer:

I take the liberty, as a subscriber to your Journal, the arrival of which I look forward to with pleasure, to ask you if you can inform me what numbers of your Journal have the tabulated list of the cost of the municipal electric lighting in all the cities in the United States. I remember seeing a table of that kind and you can more readily inform me, as I have not the back numbers on file. Will you kindly forward me the number having the desired information and advise me of the cost and I will remit to you immediately.

Jos. H. DeGrange,
Second Vice-President.

A page of statistics relating to seventy-six electric lighting plants in the United States and Canada was published in the Municipal Journal and Engineer for August, 1902; general tables of electric light statistics have been published in other issues as follows: One, including returns from eighty-eight American cities, April, 1902; and half pages of statistics in serial form, beginning with January, 1903, which will continue several months beyond the current issue.—[Editor.

Commercial Price of Electric Arc Lighting

————, Tenn., March 11, 1903.

Editor, Municipal Journal and Engineer:

As a member of the "Water and Lights Committee" of the town council, I would like to submit a question or two to your magazine for answer, taking it for granted that you follow the custom of other periodicals.

Suppose there is an agreed upon price for arc street lights, open style, at $83 per annum, on the basis of two hundred 2,000 candle power lights, burning on the all night schedule. On this basis:

1. What would be the price for forty 2,000 C. P. lights on the moonlight schedule, as adopted by the National Electrical Lighting Association?

2. What would be the price per light of forty 2,000 C. P. lights on the all night schedule?

3. What would be the price per light of forty 1,200 C. P. lights on the all night schedule?

4. What would be the price of forty 1,200 C. P. lights on the moonlight schedule?

By these queries I mean an equitable price on the above basis. This problem confronts us, and we would like to have your opinion, or the opinion of some impartial electrical engineer.

Can you state whether municipal lighting is an average success in the towns which have adopted it? An early reply will oblige,

E. E. Ellsworth.

In making a comparison between the cost of street lighting in different parts of the country, it is essential that local conditions be taken into consideration; such as, the price of gas, coal, labor, etc. The wide variation in the cost of street illumination in different cities is influenced, to a large degree, not only by local conditions but also by the local laws requiring conductors to be placed overhead or underground, rental of subways, etc. In answering the inquiry, therefore, the following prices of street lighting are given under approximately the same local conditions:

Clarksville, Tenn., 54 lights, 2,000 C. P. per year, per light, burning 3,680 hours..... $73.00

Sumpter, S. C., 40 lights, 2,000 C. P. per year, per light, burning 2,179 hours..... $62.50

Dayton, Ky., 47 lights, 2,000 C. P. per year, per light, burning 4,000 hours $75.00

Columbia, Tenn., 53 lights, 1,200 C. P. per year, per light, burning 4,000 hours..... $88.00

Winston-Salem, N. C., 56 lights, 1,200 C. P. per year, per light, burning 2,179 hours..... $75.00

Raleigh, N. C., 79 lights, 1,200 C. P. per year, per light, burning 4,000 hours $74.75

Moonlight schedule .....2,179 hours.
All dark hours.....3,680 hours.
All night .....4,000 hours.

Based on an average of $83.00 per annum, per light, for two hundred 2,000 candle power lights, on all night schedule, the price of forty 2,000 C. P. lights on all night schedule should be about $90 per light per year; the price for forty 1,200 candle power lights, on all night schedule, should be about $80 per light per year; the price of forty 1,200 candle power lights on a moonlight schedule should be about $70 per light per year.

The foregoing estimates are made on a commercial basis and allow a fair profit for the owner of the plant.

My observation in regard to municipal lighting has demonstrated that while municipal plants are not conducted upon as economical a basis as those under the management of private corporations, the citizens generally secure their lighting at a lower rate, the streets are lighted at a lower rate per arc lamp and the city receives more than under private ownership—in this sense municipal lighting is a success. Local conditions should govern any municipality in the installation of a municipal lighting plant. It is not always advisable to have such a plant.—[Editor.

Classification of Engineering Employees

————, N. Y., March 28, 1903.

Editor, Municipal Journal and Engineer:

In the organization of a city engineer's office how are the employees classified in regard to importance, namely, engineer, leveler, transitman, draughtsman, and how do the salaries range?

Carl L. Lund.

The usual classification and salaries are about as follows:

Engineer and Deputy Assistant Engineer, $125 to $175 per month.
Transit-man, $100 to $125 per month.
Leveler, $90 to $120 per month.
Draughtsman, $90 to $120 per month.
Ass't Draughtsman, $75 to $100 per month.
Rodman, etc., $60 to $90 per month.

These prices generally prepail in cities of 100,000 population and over.

In Scranton, Pa., the city engineer receives $2,000 per year; first assistant, $1,140; second assistant, $1,080; third assistant, $690; level man, $780; rodman, $660; chain man, $600.

In Allegheny, Pa., the superintendent of the Bureau—which corresponds to city engineer in other cities, receives $2,500 annually; first assistant, $1,200; second assistant, $1,080; third assistant, $900; draughtsman, $1,080; assistant draughtsman, $900; rodman, $600 to $720; chainman, $480 to $600.—[Editor.

Public Comfort Stations

Washington, March 15, 1903.

Editor, Municipal Journal and Engineer:

I have lately become familiar with your Municipal Journal, covering so many valuable points for city affairs, and thinking that you may be able to help me on a subject upon which I am anxious of obtaining some information, I write to ask if, under any of your publications, you have taken up the subject of public comfort stations. If you have, and there are any volumes pertaining to such buildings, I should be pleased to have you send them to me together with the bill. I am anxious to obtain all the information on this subject possible, as this city is considering the question of such buildings for the convenience of its citizens and visitors.

H. B. Davis, *Inspector of Plumbing.*

The only extensive specific account of any public comfort station we have published was that of one recently proposed for San Francisco, in the December issue of 1902, page 295. This subject was treated quite extensively in the Report on Public Baths and Public Comfort Stations by the Mayor's Committee of New York City, of which Dr. W. H. Tolman was secretary, in 1897, under the Strong administration, copies of which may be secured from Dr. Tolman at his address, 287 Fourth Avenue, New York, for one dollar. It is a cloth bound volume of 250 pages, well illustrated with plans and specifications. —[Editor.

Specifications and Instructions for Brick Paving

————, PA., March 24, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Will you kindly advise me as to the getting of sample specifications and instructions for brick paving?

Our borough is contemplating the paving of a number of streets and I would like to know the latest and best practice.

E. W. HESS, *Engineer.*

The latest and best practice in regard to the laying of paving brick is given in Ira O. Baker's book, recently published, on "Roads and Pavements," price $5.00; and in J. B. Johnson's book on "Engineering Contracts and Specifications," price, $3.00.—[EDITOR.

Crude Tar Not Good for Road Building

————, MICH., March 23, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I read, with great interest, what you have published in regard to coal tar pavement, especially the article by Prof. A. W. Dow, in your March number.

We have in our city macadam streets that are in need of repairs and top dressing from 2½ to 3 inches thick; the bottom and foundation of these streets are of excellent material and it occurred to me that this top dressing, of say three inches, might be mixed with tar and in that way make a good serviceable pavement.

I would be much pleased to have your opinion upon this matter, and if you thought favorably of it, to let me know in what proportion the tar and gravel should be used and any other information in connection with it.

P. H. DEVINE, *Superintendent,*
Board of Public Works.

Prof. Dow's article, published in our March issue, and experience elsewhere with the use of coal tar materials, has conclusively demonstrated that crude coal tar does not make a satisfactory pavement. The use of coal tar, in its crude state, for pavements originated in England, years ago and has long since been abandoned as worthless, but within the past few years, bituminous cement has been manufactured from coal tar materials and has been used in the construction of bitulithic pavement by the Warren Brothers Company, Boston, with great success. The City Engineer of Nashville, Tenn., reports that this pavement was laid, with marked success, in his city last year, utilizing the old macadam foundation, and the work is to be largely extended this season. I should not advise, therefore, the use of coal tar in its crude state for the purpose you mention.—[EDITOR.

About Federation of Municipal Societies

CONSIDERS IT A WISE MOVE

ROCHESTER, N. Y., March 6, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Referring to the communication of the Hon. Clinton Rogers Woodruff, Chairman of the Committee on Federation of Municipal Associations, on page 70 of the February number, of your valuable journal, I beg to say that the writer, in his annual address as president of the American Society of Municipal Improvements, brought this matter to the attention of the Society, at its Ninth Annual Convention at Rochester, last October.

The subject was discussed at length by the Executive Committee, but as no definite plan was before the committee it was deemed best to defer action for another year. It was the opinion of the writer that some arrangement should be made along the lines suggested by Mr. Woodruff, whereby each society should carry on its own work independently, and at the same time not in conflict and not in duplication of, the work of other societies.

E. A. FISHER, *City Engineer.*

BELIEVES FEDERATION PRACTICABLE

BOSTON, Mass., March 2, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I am positive that it would be wise if a closer affiliation of the various associations working along the same line could be brought about, and I am, therefore, heartily in favor of the movement which the Hon. Clinton Rogers Woodruff is prompting. I believe it is both possible and practicable to effect an affiliation; that, in such a federation, it would be well to preserve the identity of the different societies and perhaps even encourage the formation of other similar societies; that, these various organizations should have a general secretary and be represented in a general council. In this way there would be no clashing of interests and a duplication of work would be avoided.

WARREN H. MANNING, *(Landscape Architect.)*

MAYOR HAYES APPROVES CONSOLIDATION

BALTIMORE, March 3, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

I fully approve of a consolidation of the municipal organizations and will gladly co-operate. THOMAS G. HAYES, *Mayor.*

"DEPENDS UPON THE PURPOSE IN VIEW"

CHICAGO, Ill., February 25, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Whether there be present need for a federation of federations among municipal improvement organizations depends upon the purpose in view. In emergencies, when the pressure of all organizations having a common interest is necessary to bring about a specific improvement, some machinery for co-operation ought certainly to be available. This is especially true of undertakings of national importance. Federation and co-operation of local societies for local schemes have proven successful in numerous instances under the leadership of the American League for Civic Improvement. In the strictly municipal field, there seems to have been great overlapping of activities by various organizations, and anything which contributes to better organization rather than to duplication of organizations ought to be welcomed as a sign of the times in improvement work.

FRANK CHAPIN BRAY, *Editor, The Chautauquan.*

"IT IS DECIDEDLY ADVISABLE"

EASTON, PA., February 26, 1903.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

As to a statement of my opinion concerning the federation of existing organizations devoted to the study of municipal affairs, I beg to say, that I think such a federation is decidedly advisable, and is immediately practicable to a limited extent. The condition most generally recognized as objectionable in the present multiplication of such organizations seems to me to be not the number of these, but rather the unnecessary overlapping of the separate fields of inquiry. I do not, therefore, think that there should be a union of the societies; that anyone should lose any of its present individuality or identity. The result aimed at should be rather an economy of energy, obtained by avoidance of duplication and mutual interchange of information; and, in addition, opportunities for occasional interchage of ideas upon topics of common interest, these being both in formal meetings and in informal social gatherings. I would suggest, for instance, that a federation statistical committee, act as a clearing house for municipal statistics, and that, instead of two or three committees of each of the societies sending out as many blanks to city officials requesting information, the federation committee obtain the information on one blank—together with the thanks of said city officials for this minimum of demand upon their time and courtesy. Again, each member of the federation of municipal organizations might receive an abstract of the papers read before all the federated societies; if, indeed, all the papers in full, or at least a number of the more valuable ones, be not sent to all members of the federation. The holding of annual meetings at the same city, either at the same time or consecutively, might be more difficult to accomplish; but I think that the social and educational advantages would be considerable. (It might be found most practicable to hold such union meetings once in two or three years.) And many other advantages of concerted or concordant action might be advanced.

I believe such a federation, so organized as to avoid all jealousies between societies and to affect the autonomy of none, is desired by many, if not most members of all the organizations concerned, and that the time is ripe for its formation.

A. PRESCOTT FOLWELL,
Consulting and Designing Engineer.

Personalities

—Mr. G. W. Slaughter was elected Mayor of Marianna, Ark.

—Mr. John L. Rouse has been selected as City Solicitor of York, Pa.

—Mayor Robbins was re-elected as the head of the city government at Medina, N. Y.

—Mr. Charles Straub was elected Mayor of Grafton, W. Va., on the Democratic ticket.

—The municipal election in Oakland, Cal, resulted in the selection of Mr. Warren Olney, candidate of the Democrat-Republican Municipal League.

—Former Mayor John Powell, of Marshall, Mich., one of the most prominent business men of the city died of pneumonia. He was mayor of the city from 1900 to 1902.

—The following officers were elected by the Council of Portland, Me.: City Clerk, C. K. Howe, who will serve as City Treasurer and Collector; City Solicitor, F. E. Beane.

—The City Council of Lynn, Mass., recently re-elected the following officials: City Auditor, Austin E. Edwards; City Engineer, George I. Leland; City Electrician, E. L. Hiller.

—City Solicitor William P. Whyte, of Baltimore, Md., has resigned. His private business has suffered while he was in office and he felt he must pay proper attention to it. He is seventy-eight years old.

—In the latter part of February, Mayor M. J. Walsh of Yonkers, N. Y., was quietly married to Miss Florence C. Callahan. His marriage, which is his second, caused surprise among his friends as few knew of it at the time.

—Mayor J. J. Williams, of Memphis, Tenn., recently filed suit against *The Scimitar* for alleged libel which appeared in an editorial in that paper in February insinuating that the Mayor had used his office for dishonest and corrupt ends.

—The Council of South Portland, Me., has elected the following officials: City Clerk, William E. Allen; City Treasurer, William G. Thomas; City Solicitor, David E. Moulton; City Auditor, Clarence A. Williams; Street Commissioner, W. A. Springer.

—A joint convention of both branches of the City Council of Taunton, Mass., elected Mr. Luther Dean to the position of City Engineer to fill out the unexpired term of Mr. George A. King, who resigned to become clerk and superintendent of the water department.

—The results of the mayoralty elections in New Jersey, in March, were as follows: Plainfield, Mayor Newton E. Smalley, Republican, re-elected; Seabright, Mr. George W. Elliott; South Orange, Mr. Alexander Maybaum; East Newark, Mayor Henry E. McKenna, Democrat, re-elected.

—Elections in New Hampshire resulted as follows: Portsmouth, Mr. George D. Marcy, Democrat, was elected Mayor; Somersworth, Mayor John N. Haines, Republican, was re-elected; Berlin, Mayor John B. Gilbert, Republican, was re-elected; Laconia, Mr. Woodbury L. Melcher was elected Mayor on the Republican ticket.

—Ex-Mayor John C. Rankin, who was four times at the head of the city government in Elizabeth, N. J., died on March 20 from the effects of an operation for cancer. Mr. Rankin was the head of the John C. Rankin Company, of New York, printers and stationers, was a member of several clubs and a prominent Republican of New Jersey. It was due to his efforts that his city was redeemed from bankruptcy.

—At a special meeting of the Council of Parkersburg, W. Va., Mayor J. W. Vandervort was suspended after escaping a coat of tar and feathers at the hands of a crowd of excited citizens. He was accused of playing into the hands of the Baltimore & Ohio railroad, whose attorney he is, at the expense of the city. The railroad seized a street for track purposes, and the mayor ordered the police and firemen not to interfere with the company.

—The victim of his own advice and orders, Mayor J. B. Smith, of Deshler, O., was arrested by his city marshall for drunkenness and lodged over night in jail. A short time ago on occasion of a smallpox scare, the mayor, as editor of a weekly newspaper, advised the citizens to drink lots of whiskey. A large increase in drunkenness was the result, and the mayor ordered his marshall to arrest the first man found under the influence of liquor. The first man happened to be the mayor himself.

—In accordance with the request of Mayor Rodenbeck, Commissioner of Public Works J. Y. McClintock of Rochester, N. Y., has resigned his office. There has been much friction between His Honor and the Commissioner over a new water supply from Lake Ontario, the Mayor favoring a pipe line from the Lake and the Commissioner strongly opposing it as not giving the city pure water even for manufacturing purposes. Mr. McClintock's deputy, Mr. Thomas J. Neville, has been appointed by the Mayor to the office of Commissioner.

—Mayoralty elections were held in several cities in Maine during March, and the following officials were selected: Auburn, Hon. E. G. Eveleth was elected on the Republican ticket; Bangor, F. O. Beal, Republican, was elected; Bath, Mayor Edward W. Hyde, Republican, re-elected; Hon. Joseph Goosch, Republican, re-elected; Mr. William S. Mildon, Citizen's party, was elected; Ellsworth, Dr. Alexander C. Hagerthy, Republican, was elected; Gardiner, Mr. Edwin L. Russell, Republican, was elected; Hallowell, Mr. J W. Fuller, Republican, elected; Lewiston, Mr. William B. Skelton, Republican, elected; Rockland, Captain Israel Snow, Republican, elected; Saco, Mr. Luther R. Moore, Democrat, elected; South Portland, Mr. George T. Spear, Republican, elected; Waterville, Mr. Cyrus W. Davis, Democrat, elected; Westbrook, Mayor Joseph A. Warren, Republyican, re-elected.

Philadelphia's New Mayor

On April sixth, the Hon. John Weaver will be inaugurated mayor of Philadelphia. Mr. Weaver succeeds the most notoriously bad chief executive the Quaker City has ever had, and one thing is pretty clearly defined at the outset, namely, that he certainly cannot give an administration which will be worse than that of his predecessor; but much better things are expected, for during the campaign he received the indorsement of the Municipal League of Philadelphia and the public generally. His high personal character, intelligence, vigorous and energetic administration of his former office, as District Attorney, lead the public to believe that he will be faithful in the discharge of all his duties as the Chief Executive of the city.

Mayor John Weaver

"By his conduct of the District Attorney's office," said *City and State* shortly after his nomination, "during year just closed, Mr. Weaver has earned the right to have accepted with good measure of public confidence any public pledges he makes, and so far as concerns those that have been made, necessarily more or less informal, in connection with his prospective nomination to the mayoralty, it is to be noted that his declarations are most encouraging. * * * The expressions he has already made in that direction appear to be heartily and unequivocally in favor of an honest and efficient administration. * * * There is back of any promise he may make his high personal reputation and his excellent official record as District Attorney, and by no means the least encouraging of these affirmations is this one which he made to *City and State,* in commenting upon the question that bore upon his probable attitude toward local civil service: 'Any man that knows me knows that if there is a law to be enforced that I know of, I will enforce it.'"

Taking all things into consideration we congratulate Philadelphia upon the election of Mr. Weaver. We sincerely hope that the expectations of his friends and the municipal reformers may be more than realized.

Macfarland Reappointed Commissioner at Washington

THE renomination of Mr. Henry B. F. Macfarland, as Commissioner of the District of Columbia, came as a surprise to all his friends, inasmuch as his former term does not end until May. President Roosevelt desired that the Senate, now in session, should have the opportunity to act on the nomination and permit of no interruption in the good work that Mr. Macfarland has been carrying on for the last three years.

During the last three years Mr. Macfarland has worked to place the finances of the District on a business basis and to improve the District in every possible way. Sewage disposal and filtration plants, a union station for the railroads, etc., have been some of the projects that the Commisisoner has had under his supervision. The development of the park system of the city of Washington, as outlined by the Senate Park Commission, has been supported by the Commissioner in every way.

As President of the Board of Commissioners, Mr. Macfarland has represented them on important occasions, including not only celbrations in Washington, but also outside of the city. He has been the orator of the District on many occasions, such as the District centennial day in 1900, District of Columbia day at Buffalo, at dedications of public buildings, etc.

Commissioner Macfarland has had immediate supervision of the board of education, the Board of Charities, the Board of Children's Guardians, the Excise Board, the Board of Medical Supervisors, the Pharmacy Board, the fire department, the insurance department, the electrical department, the health department, the harbor and river department, the coroner's office, the inspection of weights and measures, the markets and some minor offices, besides all duties of the board not otherwise assigned.

When the Board of Education and the Board of Charities were instituted in July, 1900, Commissioner Macfarland selected the members of the former and recommended these of the latter to the President.

The fire department was reorganized by him and he introduced the methods in vogue in the department of inspection of electric wiring. The department of insurance was organized in January, 1902, by the Commissioner and its first superintendent, Mr. T. E. Drake, was appointed by him.

The press of the city of Washington expressed its great satisfaction on the reappointment of Commissioner Macfarland by President Roosevelt, and eulogized his past work for the improvement of the city. As stated editorially in the Washington *Post:* "Mr. Macfarland has made an excellent Commissioner. He is enlightened and capable. An intelligent fidelity to his duty has characterized his every official act. He has come to be in touch with the entire community. He is a sincere and trustworthy gentleman. If he has been a good Commissioner for three years past—and surely none can gainsay the fact—he will unquestionably make a better Commissioner the ensuing three years. He has grown in usefulness, as in public esteem. There is every reason why he should be continued in his important trust, and no reason whatever to suggest a change."

Convention Dates

APRIL

The American Railway Association will meet at New York City, April 22nd. W. F. Allen, 24 Park Place, New City.

The eleventh annual meeting of the National Municipal League will be held at Detroit, Mich., April 22-24. Clinton Rogers Woodruff, secretary, 121 South Broad street, Philadelphia, Pa.

An International Good Roads Conference will be held at St. Louis, Mo., April 27th to May 2nd. R. W. Richardson, 140 Laclede Building, St. Louis.

The Municipal State Convention of Louisiana will be held at New Orleans in April. James S. Zacharie, secretary, 803 Common street, New Orleans.

MAY

The National Conference of Charities and Corrections will be held at Atlanta, Ga., on May 6th to 12th. Joseph P. Byers, Jeffersonville, Ind.

The National Electric Light Association will meet at Chicago in May. James B. Cahoon, New York City.

The National Veteran Fireben's League will convene at Boston, Mass., in May.

The International Chiefs of Police Association will hold its annual meeting at New Orleans, La., May 12th to 16th.

An exposition will be held at Dresden, Germany, May 20th to September 30th, for the study of improvements in municipal government in all its branches. Oberburgermeister, Geh. Finanzrath a. D. Beutler, Dresden, Saxony.

JUNE

The annual convention of the American Institute of Electrical Engineers will be held at Niagara Falls, N. Y., June 29th to July 3rd. Ralph W. Pope, secretary, 95 Liberty street, New York.

JULY

The International Fire Prevention Congress will be held in London, England, from July 7th to 10th, in connection with the International Fire Exhibition.

The seventh annual meeting of the American Park and Outdoor Art Association will be held at Buffalo, N .Y., July 7th to 9th. Charles Mulford Robinson, secretary, 65 South Washington street, Rochester, N. Y.

OCTOBER

The next meeting of the League of American Municipalities will be held at Baltimore, Md., October 7-9. John McVickar, Des Moines, Iowa.

Reduction of Sewage in a German City

ALL the sewage of the city of Cassell, Germany, is allowed to flow into the sewers to which is also contributed the liquid refuse from manufacturing concerns. In 1897 sewage works were constructed just outside of the town. Altogether the sewage dealt with amounts to over 2,500,000 gallons a day, of which one-tenth has to be pumped. When the sewage reaches the works it flows into and through five settling tanks, which have a total capacity of 525 gallons. These tanks are one hundred and thirty feet long, thirteen feet wide and ten feet deep, arranged side by side. Inlet weirs to each tank are six feet six inches long, and the outlet, nine feet nine inches. Near the latter is a screening arrangement. No chemicals are used to assist in depositing the suspended matter in these tanks, but the presence of waste acid in the sewage probably assists in the deposition of the solids. The settling tanks are kept clean and no septic action is allowed to take place. The effluent from the tanks is discharged directly to the river Fulda.

Inasmuch as the distribution of the sludge from the settling tanks onto land adjoining the works proved objectionable, an engineering company made arrangements with the city to take care of the sludge. The sludge is discharged into tanks provided by the company and from it are extracted grease and dry manure, the sale of which more than pays for the expense of the work. Every week from three hundred to four hundred and fifty tons of liquid sludge are dealt with. The sludge is screened, acidified with sulphuric acid and then heated to 100° Cent. It is then run into filter presses and all the liquid forced out. The sludge cake is then put into a disintegrator, broken up, and later dried in a steam heated drying machine. From this the cake is discharged into the extractor for the purpose of recovering the grease, of which it contains about fifteen per cent. Heated benzole is flowed through the cake into the extractor and then passes downward through a filter cloth into a cylinder whence it is distilled over. This operation is repeated three times and usually removes all the grease from the sludge cake. Each charge of cake produces about two thousand pounds. To obtain this one thousand, three hundred and twenty gallons of benzole are used, one per cent. being lost in the operation. The residue after the extraction of the grease consists of a dry powder, containing about three per cent. of nitrogen and readily salable as manure. The grease is again refined, producing five parts of distillate, one part of tar and one part of water. It is estimated that the distillation of one ton of grease costs from $1.75 to $2.50. The grease obtained is sold for soap and candle-making at $95.00 a ton, while the manure is valued at $7.50 a ton.

Asphalt Trust in Bad Shape

(N. Y. Herald, March 19, 1903.)

A complete schedule of the subsidiary companies that make up the National Asphalt Company and the Asphalt Company of America was filed to-day (March 18th) in the United States Circuit Court by John M. Mack and Henry Tatnall, receivers of the defunct trust. There are sixty-six of the subsidiary companies, and the leakages in the various concerns are shown in the schedule.

The forty-one subsidiary companies of the Asphalt Company of America show a net loss of $1,594,000, and the twenty-five subsidiary companies of the National Asphalt Company show a net loss of $60,000, or a total net loss of $1,654,000. The companies showing the greatest losses are the following:—

Alcatraz Company, of West Virginia, $160,586; Alcatraz Asphalt Paving Company, $123,675; Alcatraz Paving Company, of Pennsylvania, $398,023; Bermudez Asphalt Paving Company, $123,794; National Contracting Company, $825,635; Warren Sharf Asphalt Covering Company, $182,462. The two companies that made gains are Barber Asphalt, $351,502, and New Trinidad Lake Asphalt Company, $404,461.

The Gilsonite Roofing and Paving Company of Missouri was the one subsidiary company of the National Asphalt Company that made big losses. Its losses were $138,537. The Gilson Asphalt Company of Missouri shows gains of $120,679, and the Pennsylvania Asphalt and Paving Company, another subsidiary of the National Asphalt Company, shows gains of $79,018.

The American Oil and Asphalt Company shows a loss of $8,988.30. The Central Bermudez Asphalt Paving Company, of Indiana, shows a loss of $28,522.97. The Columbian Construction Company, of New York, shows a loss of $63,062.92. The assets of this company include an item marked "Good will, $430,000."

The Colorado Paving Company, of Colorado, shows a loss of $24,479.13. The Consolidated Paving Company, of West Virginia, shows losses of $1,495.97. The Globe Asphalt Company, of New Jersey, has a surplus of $103.13. The Indiana Bermudez Paving Company, of Indiana, shows a loss of $26,326. The Iroquois Iron Works, of New York, shows a surplus of $25,723.35.

The New York and Bermudez Company shows a surplus of $3,954.91. The New York Mastic Works show a loss of $12,747.05. The New York Paving and Repair Company shows a surplus of $3,440.55. The Oil Storage and Transportation Company, of California, shows a surplus of $2,134.02. The Pacific Asphalt Company, of Illinois, shows a loss of $11,638.79. The Pittsburg Asphalt Paving Company shows a surplus of $5,047.98. This company has schedules and assets as "good will," $236,054.08.

The Richardson & Ross Asphalt Paving Company shows a loss of $23,452.01. This company has an item marked, "Good will," $125,364.93." The South American Trinidad Asphalt Paving Company shows a loss of $36,074.41, despite an item marked, "Good will, $132,014.05."

The Southern Paving and Construction Company, of West Virginia, shows a loss of $69,863.25, despite "good will, $100,000." The Southern Asphalt Paving Company, of West Virginia, shows a loss of $125.26. The Standard Asphalt Company, of New Jersey, shows a surplus of $20,155.36. The Standard Asphalt Company, of California, shows a loss of $35,042.50. The Trinidad Asphalt Paving Company, of Portland, Ore., shows a loss of $17,785.63. The Trinidad Asphalt Refining Company, of New Jersey, shows a loss of $54,478.56, despite an item marked, "Good will, $25,000."

The Trinidad Bituminous Asphalt Company shows a surplus of $18,425.05. The United Asphalt Company, of New Jersey, shows a loss of $2,500. The Vulcanite Paving Company, of New York, shows a loss of $27,809.59. The Western Paving and Supply Company, of Illinois, shows a loss of $83,622.06. The Western Paving and Supply Company, of Wisconsin, shows a surplus of $32,690.93.

The Franklin Oil Company, of California, shows a loss of $3,596.21. The Grant Paving Company, of Nebraska, shows a loss of $23,740.00 The New Jersey Asphalt Company shows a loss of $3,013.29.

Of the subsidiary companies of the National Asphalt Company, the Commercial Asphalt Company, of New York, shows a surplus of $2,496.55. The David Folz Asphalt Paving Company, of Ohio, shows a loss of $23,424.80. The Gilson Asphalt Company, of New Jersey, shows a loss of $2,058.23. The Gilson Asphalt Company, of Colorado, shows a loss of $12,908.31.

The Mack Paving Company, of New York, shows a surplus of $15,495.91. "Good will" and assets are scheduled at $10,000, and that is put in the liabilities as capital stock.

The Manhattan Trap Rock Company shows a loss of $32,960.27. The New Jersey and Mexican Company shows a loss of $58,630.61. The Venezuela Asphalt Company of New Jersey, shows a loss of $3,222.15.

Several of the companies are shown to have neither assets nor liabilities.

Advantages of Public Ownership

How much better off municipalities would be if the public services were owned and operated by the people has been outlined in an article on "Public Ownership" by Prof. Frank Parsons. Among the benefits to be derived from public ownership are, the abolition of the unjust discrimination in freight rates and taxation without representation through excessive rates, good government prevented at present by the corrupting influence of private monopolies, democracy in industry prevented by the overgrown power of a few because of excessive wealth, the development of manhood by improving the conditions of labor and by changing the ideas of men and youth. Low rates are not the least of the benefits to be derived from public ownership and the author cites several cases in proof. "One of the most striking examples of the difference between public and private ownership is to be found in a comparison of the charges on the bridge in St. Louis owned by the Goulds and those on the bridge owned by the cities of New York and Brooklyn:

CHARGES FOR CROSSING.

Private Bridge.	*Municipal Bridge.*
St. Louis Bridge (cost $13,000,000, bought by the Gould interests for $5,000,000).	Brooklyn Bridge (cost $15,000,000). On "L" roads 3 cents (2 fares for 5 cents) if you simply wish to cross the bridge—if you come from a distance or are going beyond the bridge it costs nothing to cross it either on the "L" cars or the surface cars—the ordinary carfare takes you over without extra charge.
On steam cars 25 to 75 cents per passenger.	
Street car fare 10 cents, 5 cents for bridge.	
Foot passengers..... 5 cents	Foot passengers.....Free
Vehicles, one horse.....25 cents	Vehicles, one horse..... 5 cents
Vehicles, two horses....35 cents	Vehicles, two horses....10 cents
Bicycles .....10 cents	Bicycles .....Free

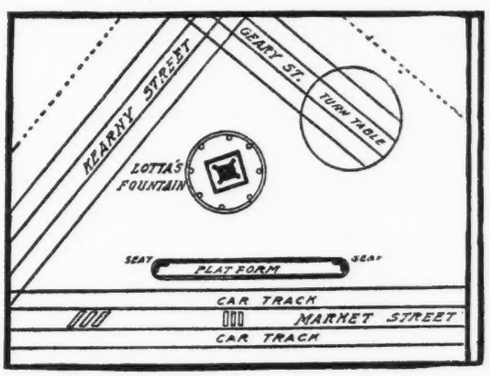
"The net earnings of the St. Louis bridge are 1¼ millions per year, or 25 per cent. on the Gould investment, and 12 per cent. on the imparable capital (the excavating of the tunnels will never have to be done over again). The St. Louis charges may be objected to, not only as extortionate, but as discriminating. A passenger who buys a ticket in New York or Philadelphia to St. Louis or beyond has to pay 75 cents for crossing the bridge; whereas if he buys a ticket to East St. Louis and then crosses the bridge in a railroad train it will cost him only 25 cents, or 10 cents if he crosses in a street car. The St. Louis bridge is managed for private profit; the Brooklyn Bridge is managed for public service, the aim being to make the bridge as useful to the people as possible."

The author differentiates between public ownership and government ownership. If the people own the legislatures in fact and can prevent any monopoly of law making in the hands of a corrupt body, public services will be under public ownership and to own and operate all such, the people must first own and operate the government. Therefore "direct legislation, civil service reform and direct nominations by the voters must form a part of every true plan for the public ownership of monopolies."

An "Isle of Safety" in San Francisco

FEW cities in the United States are as fortunate as San Francisco, Cal., in having such a public spirited body of men as the Merchants' Association of that city. Its members are always on the look-out for an opportunity to benefit the city in every possible way. Not long since the Association offered a convenience station to the city authorities and the latter accepted. It is hoped by the Association that this convenience station will serve as an object lesson and that others of similar kind will be erected by the city itself when once the utility of the first one is realized.

The latest offer of the Merchants' Association is in the form of an "isle of safety," to be located in a congested portion of the city where it is difficult and dangerous for persons wishing to board certain



SHOWING POSITION OF "ISLE OF SAFETY"

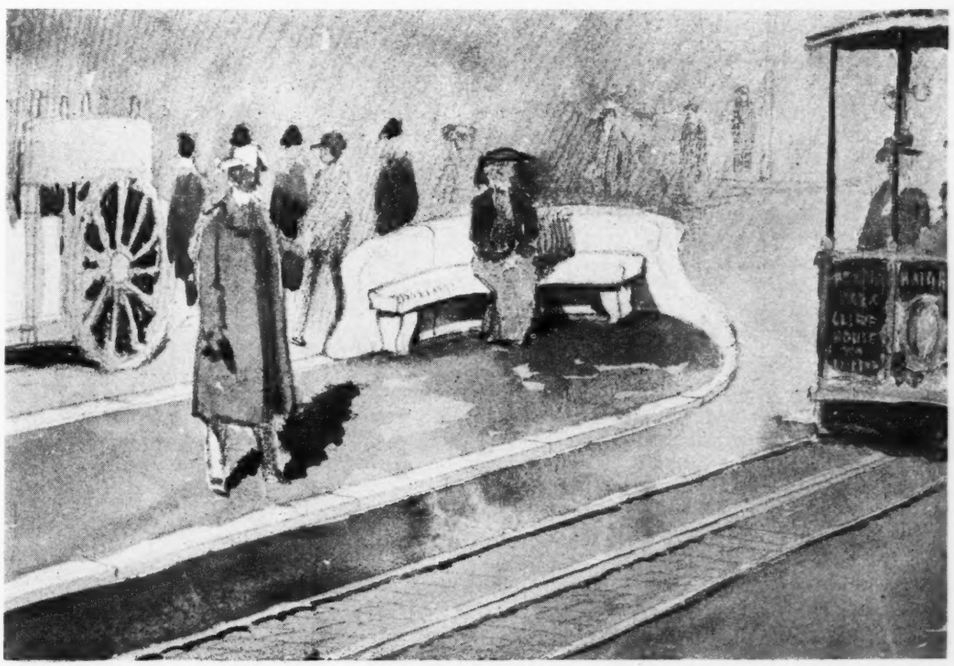
cars to reach the same. Not only will the structure form an "isle of safety," but also a station on which people may wait in comfort for the cars. It will also serve as a means of regulating traffic. At present it requires the services of several policemen to keep the trucks and wagons from becoming hopelessly mixed up and will force the up and down streams of traffic to separate, one on either side of the "isle." Pedestrians who wish to cross the wide expanse of street at this point will be able to use this platform as a stepping stone from which, after successfully traversing part of the space, they may watch their chance to cross in safety the remainder.

The plans of the Association provide for a raised platform of concrete, five inches high, six feet wide and fifty feet long, curbed with granite and supplied at the ends with ornamental buffers of sandstone, and with stone benches. The location can be readily seen from the accompanying drawing. The curb next to the car track will be so placed that people can easily step from it to the car step and yet be far enough away to prevent injury by slipping between.

The loading and unloading of cars will be greatly facilitated by the use of this platform as passengers will hesitate and wait for an open space in the stream of vehicles before alighting. Between the platform and the fountain, shown in the diagram, the space will be so narrow that only one line of vehicles will be able to pass, and, consequently, the police work will be greatly simplified. The sandstone buffers will be very heavy, so that they will be able to withstand the impact of any runaways that might occur and will afford protection to those crossing the street at such a time.

A feature, not usually found in other stations of this kind, will be the seats that are to be provided at either end. Those waiting for cars will not have to perch on the basins and buttrasses of the fountain, as heretofore, and then dodge through the crowd of vehicles in the endeavor to reach the car. It will be an easy matter for the police to keep the seats free of regular loafers.

The Association suggests that a roof could be added at any time and the whole made an object of beauty. At present the cost of the structure is estimated at $600 and it is hoped that the city will erect similar stations when once this one has proved its worth. The press of the city have expressed their approval of the work, and Chief George W. Wittman of the police department has given his unqualified approbation, as he, from a practical standpoint, realizes the great good that will be accomplished by the structure.



PROPOSED "ISLE OF SAFETY" FOR SAN FRANCISCO

Municipal Lighting for New York

THE exorbitant prices exacted by the lighting companies of New York City for the lighting of the streets has at last forced the authorities to take measures to secure lights at reasonable rates. Commissioner of Water Supply, Gas and Electricity Robert G, Monroe has sent a report to the Board of Estimate and Apportionment recommending that authority be secured from the State Legislature for the building of a municipal lighting plant. Nothing definite has been asked, only the right to build such a plant should the necessity arise. With the report of Commissioner Monroe was submitted one by C. F. Lacombe, Engineer of Surface Construction of the same department, on the conditions of street lighting in New York as compared with other cities, many portions of which were summarized in the report of the commissioner. In addition to authorizing the Mayor to draw up a bill providing for a municipal lighting plant, authority was also asked to make a ten-year contract for lighting with the right to readjust the terms every two and one-half years. The Board also decided to secure a report from an electrical engineer on the cost of a municipal lighting plant and Mr. Cary N. Hutchinson was engaged.

The main points in the report of Commissioner Monroe were as follows: The City of New York is paying far more for lighting proportionately than any other municipality, as is readily seen from the data submitted by Mr. Lacombe. A section of the charter provides that contracts are to be made after public bidding and for one year only, and was probably drawn with the expectation of securing active competition in street lighting, but the lighting interests of the city have practically united, or the territory has been apportioned between the different companies. The Commissioner says that the

extension of the territory covered by the gas mantle lamps is badly needed, as with these lamps the same consumption of gas gives three times the illumination by the open flame lamp. Chicago pays $2.40 additional a year for this kind of lamp, while Manhattan pays $11.50 and Brooklyn $15 additional. While restrictions in the charters of some of the gas companies prevent such high prices for the open flame burner, as is asked by others, it is impossible to substitute incandescent mantles on these cheaper lamps without transferring the lamps from the mains, or rather from the books of one company to those of another, paying the latter company's price. Based on the price charged in Chicago, it would be possible to change 20,000 open-flame to incandescent burners from the saving on the 5,500 mantle lamps now in use. The lighting of the streets would be improved 100 per cent. and $40,000 would be saved on the appropriation.

Inasmuch as the section of the city charter referred to above is too inelastic to permit of the city being benefited by competition, the Commissioner recommends that it be amended to allow him to make contracts without public bidding and for a term not to exceed three years when approved by the Board of Estimate.

The appropriation for lighting the city in 1903 is $3,306,346, showing an increase in five years of about 29 per cent. Notwithstanding this increase, and in view of the prices asked for lighting this year, the appropriation is inadequate to meet reasonable requirements. Considering the growth of the city, unless there is a material reduction in the prices of lighting, the annual appropriation for lighting, five years hence, will be at least $5,000,000.

As the prices for gas lighting are higher in New York than elsewhere, so the charges for electric lighting are exorbitant. The average price paid by sixty-eight cities for 2,000 c. p. lamps is $88.60, while New York (Manhattan) pays $146, and the average for twenty-three cities for 1,200 c. p. lamps is $81.08, for which Brooklyn pays $124.50. The Commissioner then shows how much the stock of the consolidated electric light companies has been watered, the capital of the Edison company representing several times its value. The Commissioner says that if the city of New York would undertake to supply itself with electric light, its interest charges would be limited to the amount actually expended on its plant and it would not be burdened with declaring dividends on watered stock. In Manhattan the electric conductors would be carried through the subways without additional rental as the companies owning them are compelled by their franchises to supply all space needed by the city. The subway rentals for electrical conductors now used for city lights amount to $100,000 a year and this sum could be deducted from the cost of distribution if the city owned its own plant. The Commissioner places the cost to the Edison Company for generating and distributing energy at 3 cents per K. W., which would place the cost of a pair of lamps taking 750 watts at $90 a year, or $45 a lamp. The cost of maintenance per lamp should not be more than $10. The direct current enclosed-arc system in use by the Edison Company results in a loss of about 40 per cent. of energy, but is necessary because it fits in with the requirements for commercial uses.

A municipal electric lighting plant would have three advantages over a private company according to the Commissioner:

"(a) Low interest payments based on loans measured by funds actually required for construction as distinguished from the fixed charges which burden an inflated capitalization.

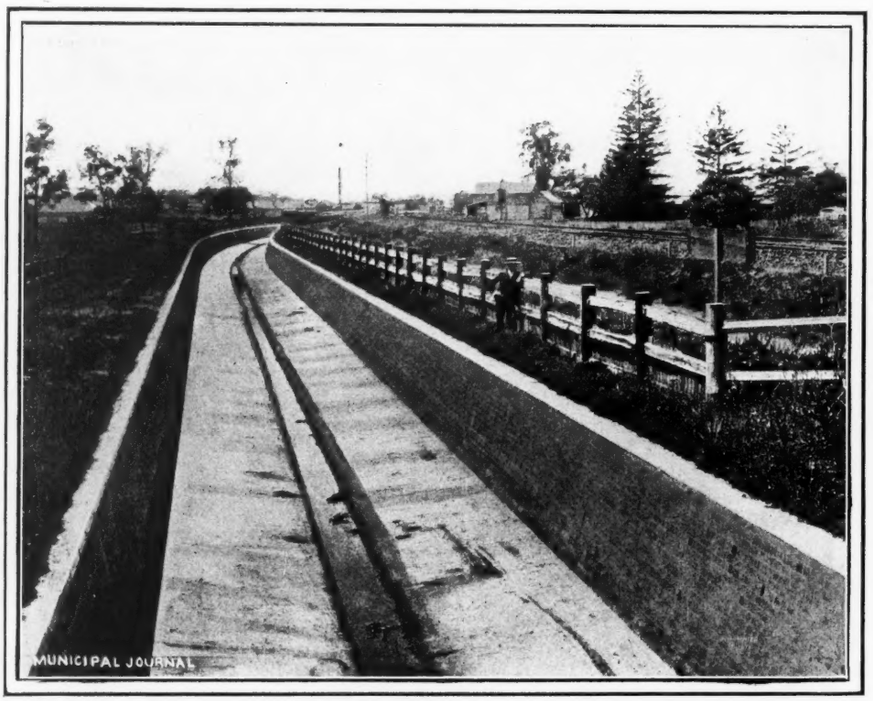
"(b) The free use of subway rights which the city has had for years and from which it has until now benefited only to a small degree.

"(c) Economy in construction and operation resulting from the adoption of all recent improvements and from having in view a single purpose—public lighting—without the complication incident to furnishing a general commercial supply."

After showing how Chicago and Detroit have made a success of electric lighting with city plants, the Commissioner concludes: "I believe New York with its own plant could provide electric lighting for public uses at a cost much below what is now charged the city. Whether reasonable prices can be obtained from private companies or whether the city can with better results maintain and operate its own plant is for you to determine. I do, however, urge that legislation be immediately asked and that you be given the power to establish and maintain an electric plant for street lighting in case later you decide that it is in the interest of the public so to do."

Indian Drainage, Stormwater Channels

THE drainage scheme for the Marrickville Valley has been vigorously pushed forward during the past two or three years. The intercepting channel, skirting the eastern side and head of the valley, is now in full operation. This channel ranges in width from twenty feet at the outlet to ten feet at the head, its average of depth being six feet. The construction of the channel to intercept the western waters presents some heavy rock-cutting through sandstone spurs. This channel is practically completed from Cook's River to the Belmore railway line. Above this is a rock tunnel 800 feet long before the channel again emerges on the flat. Owing to the heavy excavation, the upper portion of the western channel is not yet in operation.

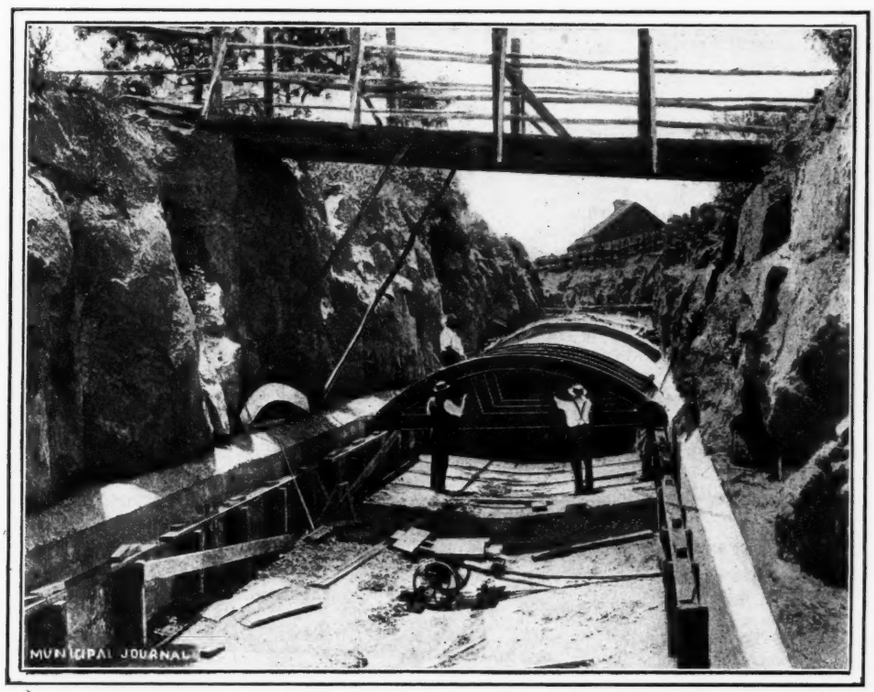


MARRICKVILLE DRAINAGE—EASTERN STORMWATER CHANNEL

Down the centre of Marrickville Valley a channel five feet wide and from two to four feet deep has been built. This channel is to carry off the water falling on the area below the intercepting contour. It discharges into Cook's River when the water in that river is at low level; but when the river is in flood a sluice-gate closes the outlet of the central channel, and the stormwater passes along a draw-off channel to the pumping station. There, alongside the pumps for raising sewage, is set a centrifugal pump, capable of raising 10,000 gallons per minute. The pump is driven by a vertical engine of the universal type, built by the Brush Electrical Engineering Company. The stormwaters are forced through a 33-inch wrought-iron main into the eastern intercepting channel.

A number of small branch drains have been and are being constructed to lead the water from collecting points into the main channels, and although the intercepting channels are only in part sufficiently advanced to give any relief, the work done in the centre of the valley has proved decidedly beneficial.

All the channels are being constructed with concrete bottoms and brick walls, both bottoms and walls being battered. The walls are finished off with a 4-inch coping of bull-nosed concrete blocks, which have been moulded on the site of the works. Main road bridges are constructed of steel girders and concrete Jack arches, and less important structures are built of timber.—*Indian Municipal Journal.*



MARRICKVILLE DRAINAGE—WESTERN STORMWATER CHANNEL

City Operates Street Railway

THE old street horse-car line in St. Thomas, Ontario, was merged into a new company in 1897 and arrangements were made with the city for extensions of the lines to a distance, in all seven and one-half miles. The company was to build and operate the road and give not less than half hour service and the city was to guarantee the bonds of the company to the amount of $50,000 payable in thirty years with interest at four per cent. The city was also to pay the first year's interest on the bonds amounting to $2,000. The company agreed to give adequate security that it would build the road and gave the city a mortgage on the road, franchises, plant, etc. In case the company defaulted in the interest for six months, or if the company failed to operate the road for the period of sixty days, the whole road, franchise, etc., were to become the property of the city. On the 8th of September, 1902, the company ceased to operate the road and the local electric company refused to supply power unless the arrears due it were paid. On resolution of the Council of the city, the City Engineer, James A. Bell, took possession of the road to place it in repair and operate it. Since the 25th of November last the road has been run by the City Engineer. The road is seven and one-half miles in length and has an equipment of six closed motor cars, two open motor cars and two trailers. Without doubt the road will be extended to Port Stanley as the franchise permits and the Parliament will be asked to allow sufficient bonds to be issued to build the extension and a power house. It is also the intention of the city to install its own electric light plant as soon as the present contract expires. This will be in three years.

An Addition to New York's Water Supply

THE needs of an increased water supply has made it encumbent upon the officials of New York City to either lay additional mains in the outlying districts or purchase the plant of companies occupying territory in the neighborhood and incorporate such purchase with the city's system. Often the purchase of existing plants is cheaper than the construction of new ones, not only on account of the actual cost of the physical property, but also because of the saving in time that would be taken in establishing the new supply. Such was found to be the case respecting the acquisition of the property of the New York and Westchester Water Company which operates in the territory north of the city of New York. The company was in the hands of a receiver when the city offered to purchase and the price asked for the works, etc., was the sum of $1,404,215.75. This amount was subdivided into the following charges:

1. Compensation for the value of the physical property, such as the pipes, fountains, hydrants, etc., within the limits of New York City, $587,412.
2. Reimbursement for the outlay necessary to connect the system not purchased by the city, with other parts of the company's works so as to make the former portion available for use by the company, $51,345.
3. A five years' purchase of the net annual revenue based upon the revenue for 1902 ($48,091.75), $240,458.75.
4. Compensation for damage to the operative value of the remaining plant, $200,000.
5. Value of the company as a going concern, with its franchises, privileges, etc., $325,000.

From the expert estimate of the physical value of the plant as made by the engineers of the Department of Water Supply, Gas and Electricity, the amount allowed for this item was placed by Mr. John R. Sparrow, C. P. A., the expert accountant employed by the city, at $452,391 instead of $587,412 asked by the receivers.

The propriety of including as an element of compensation, the reimbursement for connecting the portion of the pipe system not taken with the rest of the company's plant and the amount asked for this by the receivers, $51,345, was conceded to be both fair and reasonable and was allowed.

The converting of a stated net revenue into an equivalent value for good-will is common, and it is not unusual to base this compensation on a five years' purchase. This was considered a proper basis in this case for the reason that it would take that period to reproduce the existing plant. The revenue of the company is derived from meter and flat rates from private consumers and for charges to the city for hydrant rentals, public buildings, etc., based on contracts with municipalities consolidated with New York City, some of these contracts have but a couple of years to run. The total income from all sources for 1902 was found to be $68,790.64 and the expenses, including labor, general expenses, water purchased at the rate of 10 cents per 1,000 gallons and a franchise tax, amounted to $62,918.76, leaving a net revenue of $5,871.88. This amount was exclusive of the sum of $14,250.46, which includes certain payments for legal and engineering services connected with the normal operation of the business for 1902, for extensions of the plant, and an amount arbitrarily deducted from the cost of operation to adjust the same to the sum considered applicable to the territory in which is located the part of the system purchased by the city. The latter item includes the maintenance of a New York office and is abnormally heavy for a suburban company. Thus, in computing the actual cost of operation of the plant, the amount arrived at comprises the normal expenses of a company conducted on a suburban basis.

The contrast between the net revenue of $48,091.75 given by the receivers and that estimated by Mr. Sparrow ($5,871.88), is due

largely to the exclusion from the operating cost, as stated by the receiver of the item of water bought of the city. The reason given by the receiver for such action was that the company would furnish its own water in the near future. This statement was proved by the engineer of the Department of Finance to be fallacious.

Considering the rate at which the territory involved is increasing and from other considerations, the gross revenue of the company would increase at the rate of 10 per cent. per annum, while the expenses would not materially change. Therefore, the valuation of the company's good-will, based upon a five years' purchase of the company's net revenue, would amount to $92,594.55.

To compensate the company for loss incident to operating the part of the plant not taken by the city and for which there remains a market inadequate for paying the expenses of conducting the business, the sum of $64,171.19 has been determined. In obtaining this figure, the sum of $17,000 was taken as a liberal amount for a yearly operating expense of the upper systems above the part involved. The revenue from these upper systems was, in 1902, $3,590 after deducting local taxes. Assuming that this territory would yield a uniform increase in revenue of 5 per cent. per annum, the loss in the company's business in this territory for five years would amount to the said $64,171.19.

Concerning the fifth claim of the company, namely, $325,000, for the franchises, etc., Mr. Sparrow considers this to be "an item purely speculative in the manner of its presentation." Because the bulk of the business is on annual contracts which are on the eve of expiration, this claim is amply covered in the amounts allowed for good-will and indemnity for the loss stated in the preceding paragraph.

Summarizing the four elements considered heretofore, it appears that the amount of fair compensation to the company for the purchase of the property desired by the city would be the sum of $660,501.74.

The Board of Estimate and Apportionment passed a resolution accepting the stated price for the plant of the company less the amount due and owing to the city of New York for taxes and interest to date of actual transfer and less the sum of $25,327.01 which was the balance due the city for water supplied to the company by the city over and above the amount due the company for rental of hydrants, water rates, etc. The money has been paid over to the company and the plant is now the property of the city.

A New Municipal Light Plant

An interesting account of the installation of a municipal lighting plant at Washington, Iowa, is given by Mr. G. W. Bissell, who put in the system. The conditions imposed upon him were as follows: the power machinery to be installed in the city pumping station so as to be economically operated; all night street lighting service; modern machinery; an initial cost not exceeding $15,000; provision for further increase in the capacity.

The boilers were to be horizontal return tubular type, sixty-six inches in diameter, sixteen feet long with smoke extension eighteen inches long in continuity with the shell, which was to be three-eighths inch thick. A steel stack forty-eight inches in diameter, and sixty feet long was to be provided. A horizontal double-acting simple automatic high-speed engine, developing 125 indicated horse power with steam at eighty-five pounds pressure at one-quarter cut-off and at 275 revolutions per minute, was called for by the specifications. This was to be connected directly to the dynamo. The dynamo itself was an alternating current compensating engine eype machine of seventy-five k. w. capacity at 1,100 or 2,200 volts, single phase or two phase, sixty cycles, at 250 or 300 revolutions per minute with belted type exciter.

The line voltage was not to exceed 2,200 volts. On this was placed twenty 450 watt series alternating enclosed arc lamps for outdoor service, these being provided with copper cases, clear outer and opalescent inner globes. There were to be 120 incandescent lamps of thirty-two candle power on the circuit. Arc lamps were placed twenty-five feet above the street and incandescent lamps eighteen feet.
—"Iowa Engineer."

Statistics of Arc Lighting in United States Cities and Towns

	Population, 1900.	No. lamps. Open.	No. lamps. Closed.	Watts at lamp terminals. Open.	Watts at lamp terminals. Closed.	Schedule.	Hours burn per year.	Cost coal per ton.	Contract price per lamp per year.
Indiana									
Attica	3,005	...	105	...	550	.....	....	....	z
Auburn	3,396	45	2	340	...	(2)	2,179	$2.50	$60.00
Aurora	3,645	60	...	340	...	(3)	1,825	2.75	62.00
Bedford	6,115	60	...	480	...	(1)	4,000	1.65	80.00
Bloomington	6,460	...	65	...	430	(1)	3,650	1.45	80.00
Brazil	7,786	90	75	480	...	(2)	2,179	.90	65.00
Bremen	1,671	25	...	480	...	(2)	2,179	3.15	z
Brookville	2,037	29	...	480	...	(3)	1,825	2.15	62.50
Butler	2,063	34	...	340	...	(2)	1,575	2.45	z
Churubusco	884	20	...	480	...	(2)(3)	1,220	2.75	10-33.33 10-30.00
Clay City	1,503	7	21	480	430	(3)	1,825	1.00	60.00
Clinton	2,918	31	...	480	...	(2)(4)	1,550	1.15	65.00
Columbia City	2,975	50	...	480	...	(2)	2,179	2.45	z31.42
Columbus	8,130	82	...	480	...	(2)	2,920	2.00	z
Converse	1,415	18	...	480	...	(2)	2,179	Gas	60.00
Crown Point	2,336	26	2	340	...	(3)	2,200	2.00	76.00
Decatur	4,142	73	...	480	...	(2)	2,179	2.20	z
Delphi	2,135	29	...	480	...	(2)(4)	1,825	1.50	105.00
Elkhart	15,184	149	...	480	...	(1)	4,000	W. P.	67.50
Elwood	12,950	93	...	480	...	(1)	4,000	1.50	85.00
Evansville	59,007	265	...	480	...	(1)	4,000	.75	60.00
Ft. Wayne	45,115	321	...	480	...	.....	3,000	2.45	100.00
Franklin	4,005	48	39	480	430	(1)	3,650	1.25	72.50
Goodland	1,205	27	...	340	...	(2)(3)	1,200	2.05	72.00
Goshen	7,810	125	...	480	...	(2)	2,800	2.90	z36.00
Greenfield	4,489	64	25	480	...	(2)(3)	1,452	Gas	54.00
Greensburgh	5,034	76	...	480	...	(2)(3)	2,400	Gas	75.00
Hammond	12,376	225	23	480	430	(1)	4,000	1.47	84.00
Hartford City	5,912	115	...	480	...	(1)	4,000	Gas	60.00
Hobart	1,390	20	...	480	...	(2)(3)	1,220	3.00	z
Indianapolis	169,164	1400	...	480	...	.....	3,000	1.40	81.75
Jasper	1,863	20	3	480	...	(2)	2,179	1.50	57.50
Kendallville	3,354	60	...	480	...	(2)	2,179	2.70	z35.00
Knox	1,466	23	...	340	...	(2)(3)	1,220	1.90	60.00
Lafayette	18,116	318	...	340	...	(2)	2,200	2.35	66.00
La Grange	1,703	30	...	480	...	(3)	1,825	2.10	64.00
La Porte	7,113	91	21	480	...	21(1) 98(3)	4,000 2,000	2.10	69.00
Lebanon	4,465	80	10	480	430	(1)	4,000	2.00	82.50
Ligonier	2,231	30	40	340	...	(1)(2)	2,179	2.60	80.00
Linton	3,071	30	9	340	430	(2)	2,179	1.00	70.00
Logansport	16,204	180	60	480	430	(2)	2,920	2.05	z
Madison	7,835	125	...	480	...	(1)	4,000	2.05	80.00
Mentone	757	9	...	480	...	.....	1,500	2..00	70.00
Michigan City	14,850	86	9	480	430	(3)	1,825	2.65	75.00
Mishawaka	5,560	76	21	480	430	(2)	2,179	2.30	z
Mitchell	1,772	38	...	480	...	(2)(3)	1,560	1.65	z
Montpelier	3,405	40	...	480	...	(1)	4,000	Gas	72.00
Mooresville	974	12	...	480	...	(2)(3)	1,130	1.25	50.00
Mt. Vernon	5,132	72	...	480	...	(1)	4,000	1.35	69.75
Muncie	20,942	180	...	480	...	(2)	2,600	2.25	z46.00
Nappanee	2,208	21	...	480	...	(2)(3)	1,220	3.00	z
New Albany	20,628	239	...	480	...	(1)	4,000	1.50	58.20
Noblesville	4,792	60	...	480	...	(1)	4,000	Gas	70.00
North Vernon	2,823	...	52	...	550	(2)(3)	714	2.25	z
Oakland City	1,991	28	...	480	...	(1)	3,650	1.10	80.00
Petersburg	1,751	25	...	480	...	(2)(3)	1,700	1.00	90.00
Plymouth	3,656	...	46	...	480	(2)	2,179	2.65	70.00
Princeton	6,041	86	14	480	430	(1)	4,000	1.10	80.00
Richmond	18,226	217	...	480	...	(1)	4,000	2.17	90.00
Rochester	3,421	56	...	480	...	(3)	2,190	2.00	70.00
Rockport	2,882	...	5	...	430	(2)	2,179	.82	65.00
Rockville	2,045	50	...	480	...	(2)(3)	1,500	1.40	z
Salem	1,995	35	4	480	430	(1)(2)	2,179	2.50	72.00
Seymour	6,445	85	11	480	550	(2)	2,600	.65	65.00
Shelbyville	7,169	84	25	480	430	(2)	2,600	2.40	70.00
Sheridan	1,795	35	...	480	...	(2)	2,400	Gas	z
South Bend	35,999	274	...	480	...	91(1) 183(3)	4,000 1,825	2.50 2.50	90.00 62.50
Spencer	2,026	30	...	480	...	(2)(3)	2,200	1.85	60.00
Sullivan	3,118	...	45	...	...	(2)	2,250	1.25	60.00
Terre Haute	36,673	...	379	...	430	(1)	4,300	.90	75.00
Union City	2,716	35	...	480	...	(2)	2,650	2.50	75.00
Valparaiso	6,280	68	...	480	...	(2)(3)	1,220	2.55	67.50
Veedersburg	1,638	24	...	480	...	(2)(3)	1,400	1.60	z
Vevay	1,588	12	28	340	550	(1)	4,000	1.80	z
Vincennes	10,249	...	209	...	...	(1)	4,000	1.10	63.00
Washington	8,551	145	21	480	430	(2)	3,000	1.30	70.75
Whiting	3,983	40	...	480	...	(1)	4,000	1.75	95.00
Williamsport	1,245	26	...	340	...	(2)	2,179	2.10	z
Winamac	1,684	...	26	...	480	(4)	2,540	2.25	z
Indian Territory									
Purcell	2,277	...	4	...	...	(2)	2,179	3.33	120.00
Iowa									
Ackley	1,445	...	60	...	...	(2)(4)	2,097	1.60	72.00
Albia	2,889	35 6	...	480	... 550	(2)(1)	2,400	1.25	84.00 72.00
Anamosa	2,891	19	...	480	...	(3)	1,825	...	72.00
Atlantic	5,046	...	12	...	550	(2)(3)	1,220	1.60	.....
Bedford	1,977	...	4	...	430	(2)(3)	1,220	1.80	40.00
Belle Plaine	3,283	22	...	480	...	(2)	2,250	2.00	82.00
Bellevue	1,607	13	...	340	...	(2)(3)	1,800	Wood	z

(1) All night. (2) Moon scale. (3) Midnight. (4) After midnight up to 1 or 2 P. M. The difference in time may be judged from the column showing number of hours lamps burn. z Municipal plant. St'm. Steam.

The data given in the above table were collected by the General Electric Company, Schenectady, N. Y.

(To be continued.)

NEWS AND PRACTICE AMONG THE CITIES

Municipal Water Supply for Ithaca—Use of Cement to Protect Metal—Sewage Disposal Plant Successful—Good Roads Law Needed in Michigan

Chicago Sewage Reaches St. Louis

THAT the public water supply of St. Louis is in danger of pollution from the sewage of Chicago has been circumstantially demonstrated by Dr. Ravold, former City Bacteriologist of the former place, in his testimony before the Chicago Drainage Canal Commission. Dr. Ravold stated that imported bacteria such are as entirely foreign to the vicinity of Chicago were dumped in quantity into the drainage canal near Chicago and in a few days bacteria of this same kind were taken from the river at St. Louis where no such bacteria had ever been found before. This was partial evidence that the pollution from the drainage canal was polluting the water of all the cities and towns that obtained it from the Mississippi river below where the Illinois river meets the other.

Ithaca Votes Municipal Water Supply

AFTER a number of deaths from typhoid among the students of Cornell University and residents of the city of Ithaca, N. Y., the citizens were aroused to the fact that their water supply was badly polluted with typhoid fever bacteria. The water was supplied by a private company and the location on one of the supplying streams of a gang of Italians was the probable cause of the pollution of the water. When the epidemic was at its height the trustees of the University offered the sum of $150,000 as a loan to the company for the building of a filtration plant. Many of the students had left town, several deaths had already occurred and the hospitals were crowded with patients. On March 2 a vote was taken on the municipal ownership of the water works and the result was thirty votes against and 1,335 in favor of the project, showing the bitter feeling against the company for the polluted water that had been forced upon the city. The State Board of Health sent a representative to co-operate with the Council in cleaning up the city, disinfecting the fever houses and cleaning the streets. An estimate of about 500 cases of fever is conservative, fifty-one deaths have taken place and the city has suffered a loss of over half a million dollars. But a small portion of this sum would have provided the city with the purest of water, but as is usually the case, the stable door is not locked until after the horse has been stolen.

Good Progress Made by St. Paul

RAPID strides have been made with the means at hand by the engineering department of St. Paul, Minn., and the results obtained after a year's work make a good showing for the city in the way of improvement. The city built 9.88 miles of sewers and the City Engineer, Mr. L. W. Rundlett, is of the opinion that the "assessed cost of the sewers should be uniform as the benefits are equal whatever the size of the sewer." At present the cost varies materially and he recommends that the charter be amended to equalize matters. Grading for streets and alleys amounted to 3.6 miles. Mr. Rundlett is in favor of granite top macadam as the increased cost over slate or limestone is more than equalled by the durability of the granite. The city laid 4.42 miles af asphalt, 1.59 miles of brick and 2.25 miles of sandstone, making 46.71 miles of paved streets in the city. During the past year 13.6 miles of cement walks were laid under city contract and 14.4 miles under private, giving the city at present 177.5 miles of this kind of walk. At the present rate of progress, it will take eight years to replace the 235 miles of old wooden walks. A recent decision of a district court requiring all orders for cement walks to be accompanied by petitions from the property owners, will make trouble for the city, as it is impossible to get petitions in the outlying disttricts where many of the owners are non-residents. The City Engineer says the proper thing for the city to do is to tear up the old wooden walls as fast as they become dangerous. It is much cheaper to lay cement walks on account of their durability and the high price of lumber.

Cement Paint Will Protect Metal

IT is the opinion of some chemists that the steel used in the modern buildings will not withstand the progressive oxidation that is taking place. Manufacturers of paints have been endeavoring to make a coating for metal that will prevent corosion and oxidation. Iron or steel that is partly rusted if coated with red lead, will oxidize rapidly. Pieces of iron that were imbedded in concrete for two centuries have shown a wonderful state of preservation. Experiments made with Portland cement as a coating for steel and iron have shown that oxidation can be arrested if a paint of cement be properly applied to the metal. That if the cement be free from iron, calcium sulphate and sulphites and of low specific gravity, it will set quickly and become practically a part of the metal. This coating can be painted over with an alkali-proof paint and no moisture, carbon dioxide or factory fumes will affect the metal. The cement must be finely divided, free from iron salts, diluted with pure water and stirred for at least fifteen minutes so as to allow the lime to be liberated. Such a coating will not wash off with rain and will set within an hour.

Michigan Should Have a State Good Roads Law

THE question of the improvement of the highways of Michigan has been considered by a committee of seven of which Hon. Horatio H. Earle was chairman, and its report goes into the matter thoroughly. The recommendations of the commission were made in accordance with what experience has been gained by the members in their investigation of the subject. It is the opinion of the commission that the general welfare of the State would be greatly enhanced by a complete system of highways between the towns and that the expense involved would be amply repaid in the benefits derived. In the report are incorporated a large number of suggestions on the best manner of building and improving roads and this will be of especial value to highway commissioners and road-builders in the pursuit of their work.

The report contains the road improvement laws of some other states and how roads are built there with the specifications for construction. The recommendations of the commission include a request that the Legislature of the State allow the people to vote on the question of a State aid law and that the Legislature should investigate the laws of other states before framing one for Michigan. A commission of three is recommended in place of a commissioner on account of the peculiar shape of the State and its size. The report of Frank F. Rogers, consulting engineer and expert road-builder, is attached to this report.

The "Block Beautiful" in Brooklyn

THIS coming summer is to see an extension of the "block beautiful" in Brooklyn, N. Y., into the "district beautiful," for the work that was started last year in a small way under the personal supervision of Miss Zella Milhau and backed by the National Arts Club of New York, has caused the greatest enthusiasm among the residents of the blocks surrounding that on which the start was made. While the installation of window boxes was started with last summer, this year the planting of trees on the streets and the beautifying of back yards will be given the preference. Some work has already been done along this line and the streets that heretofore have been almost bare of trees will be lined with them. It has been the custom of allowing each householder to select what kind of tree shall be planted, but this is a dangerous policy, inasmuch as most residents have no knowledge of what trees are able to survive city conditions. The projectors of the movement should educate those desiring trees in the subject of what to plant and thus secure trees that will have some chance of developing. Information on this score can be obtained from the various reports of the park departments of cities. The work in this section of Brooklyn should be followed by all parts of Greater New York.

Well Equipped Road Department

THE department of public works in Fulton county, Ga., will soon be equipped with a new steam road roller. The old rollers have been in continuous service for the last eight years and are worn with usage and a few renewals are to be made in the matter of new wheels. When the new wheels and the new roller are placed in service, the equipment of the department will be first-class and worthy of imitation by every other county in that and other states. The county has now in use in this department 175 mules, 100 carts, two Kelley-Springfield steam road rollers, two steam drills and two rock crushers with all the necessary smaller implements.

Rochester's Water Supply Theatened

THE city of Rochester, N. Y., is threatened with the possibility of numerous cases of typhoid on account of a condition of the water supply discovered by the bacteriologist of the city, Professor Charles W. Dodge. The city drinking water comes from Hemlock Lake, which is entirely free from intestinal or typhoid germs, but the fire service is from the river which is much polluted. At twelve points valves form connections between the systems for the purpose of allowing an extra supply of water should it be needed for fire extinguishment. It is at these points that the danger to the drinking water lies, for the valves are not always absolutely tight and the river water has been able to leak through thus polluting the good water. Professor Dodge recommends that these valves be removed and that no connection be made between the systems. In his opinion the danger from fire is to be preferred to the danger to the health of the city.

"White Wings" for Atlanta

IT was recently proposed by Dr. T. D. Longino, president of the Board of Health of Atlanta, Ga., to introduce the system of "white wings" as a branch of the street cleaning department of the city. The plan was to try a few at first and later increase the number as the need for them arose. The men would be put at work at daylight and each man would have five blocks to cover. He would be provided with a broom and dirt pan and a wheelbarrow. Merchants would be compelled to do all the sidewalk sweeping between dusk and ten o'clock in the evening.

City to Be Placed on Cash Basis

THE proposition to place the city of Spokane, Wash., on a strictly cash basis has been under consideration by the financial committee of the council. Corporation Council Judson is of the opinion that such a change would work a revolution in the matter of special improvements and would result in several advantages. There would be not nearly so much special improvement work, everything would be paid for in cash at a saving of from 10 to 15 per cent. and the city would not have an enormous debt hanging over it.

At present the contractor for street paving, etc., is not paid in cash, but is given city bonds which are payable in ten annual installments. The city pays the bonds and collects from the property owners. It is not able to do this in all cases without a suit with all the trouble and expense attached. The contractors do not care as a rule to keep the city bonds but arrange with banks to buy them, and these latter make a reduction in the face value of from 10 to 15 per cent. Consequently bidders for city work add to their contract price this extra percentage to cover themselves.

Cities to Have Boards of Public Works

A board of public works has been instituted in the city of York, Pa. At present there will be no compensation attached to the office outside of the honor of serving the city. It is stated that next year the law will be amended so that the council can fix a salary for the members of the board. The first work of the new board is to be the installation of a complete sewer system for the city. Surveys are to be made and plans prepared and within a year at least the project will be in condition to permit of bids being asked for the work. The Legislature of Maine has been considering a bill establishing a board of public works for the city of Auburn, which is to have charge of the streets and sewers. There will be five members, one from each ward, elected by the council for the term of five years, but no number of the council is to be eligible for membership. The board is to appoint a superintendent of streets and sewers, who will make contracts with the approval of the board. The board of public works bill for St. Joseph, Mo., over which there has been so much controversy, has at last been signed by the Governor of the State, and now the effect will be watched closely by both sides. The city engineer and his force are practically legislated out of office until the new board appoints them again or provides for their successors. The mayor, city comptroller and city auditor have the appointment of the members of the board.

Success of Vancouver Sewage Disposal Plant

THE three septic tanks for the disposal of sewage which have been in operation in Vancouver, B. C., for several years have proved so satisfactory that the local authorities have decided to erect three additional tanks next summer. The plant will then be able to handle nearly all the sewage of the city. Not a single complaint has been received regarding this system. Its first cost is comparatively small, its maintenance is inexpensive, and it does its work perfectly, promoting public health and benefiting the city financially.

Money from New York's Waste

No more ashes or garbage of New York City are to be dumped at sea in the future; but the latter will be disposed of by the Sanitary Utilization Company, the refuse will be purchased by a paper manufacturing company and the ashes will be used to fill in the extension to Riker's Island and for filling near Newark and other parts of New Jersey where the department has contracts. As the refuse is collected it is to be separated, the papers going for the making of manila paper, and the other kinds of refuse being used by the paper manufacturer for fuel. Street Cleaning Commissioner Woodbury has marked out a scheme whereby the city will receive a large revenue for its waste matter instead of paying money for its disposal.

New Receivers for Asphalt Trust Demanded

THERE is more trouble in store for the asphalt trust if the application for new receivers is granted by the Vice Chancellor in Jersey City. Two receivers were appointed in December, 1901, after proceedings were instituted by the Land Title and Trust Company of Philadelphia, which, as trustee, holds collateral for $30,000,000 of bonds. It is contended that the first receivers are friendly to the stockholders and the bondholders wish better protection for their interests. The real value of the collateral amounts to about $9,000,000, leaving a deficit of $21,000,000. The bondholders allege that the stockholders have paid in but $6,000,000 and that, according to the laws of New Jersey, they are liable for the remaining $24,000,000. It is also stated that the receivers were appointed to save the stockholders for an assessment of the $24,000,000 and that the bondholders were not consulted or represented by the receivers, hence new ones are asked.

Curfew Law for Wilkes-Barre

AN ordinance regulating the hours that children under a certain age are not to remain on the streets of Wilkes-Barre, Pa., has been passed by the Council of that city. The law was designed to keep from the streets after nine o'clock in the evening children under the age of fourteen who are not accompanied by a parent or other responsible for their conduct, who were not sent on an errand or are in the performance of a duty directed by a parent or guardian, and those whose employment does not render it necessary for them to be on the streets. Only such children as do not come under these conditions are not to be allowed to remain on the streets and this will apply only to children under fourteen years of age who loiter and play about the public streets and commons. Before approving of the ordinance, Mayor Price took the trouble to ascertain from other cities what laws were in force respecting this point and answers to his inquiries showed that laws much less liberal were in force in Omaha, Lincoln, Neb.; St. Joseph, Mo.; Lawrence, Kan., and other American cities.

FIRST FIRE-BOATS

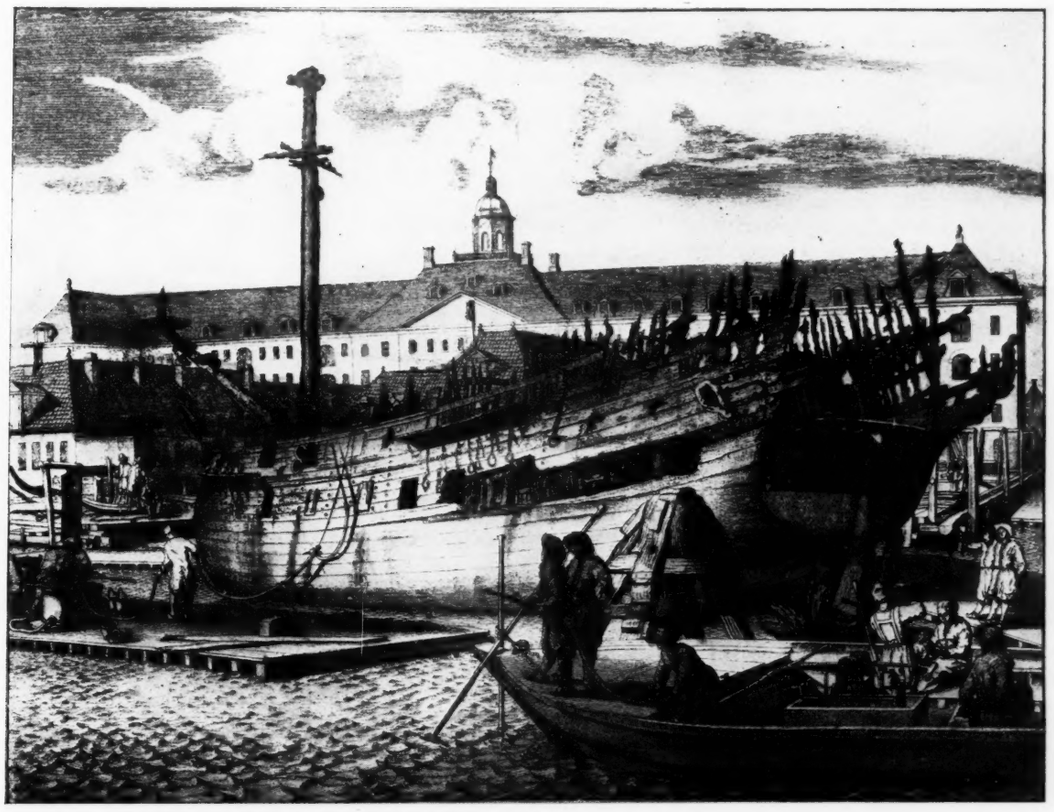
Floating Hand Engines Used for Centuries—Improvements Came Slowly—First Steam Fire-Boat in London

By Warren A. Rauch

THE date at which floating fire engines were first employed for subduing fires among shipping, along harbor or river fronts and adjacent thereto, cannot be ascertained, neither is it positively known by whom they were first used, but there is no doubt that while those worked by steam are of comparatively recent origin, those worked by hand, both for propelling the boat, or float, and the fire pumps, are as old as the hand-worked fire engine itself.

EARLIEST RECORD OF A FIRE-BOAT

The earliest account of a fire-boat that has been found is shown in the accompanying engraving, made from an old print, and shows a ship that belonged to one of the East India lines which took fire at 2:30 p. m. on the 14th of May, 1683, while lying at its dock in a German harbor. The fire started between decks and was burning for some time before being discovered. In one and a half hours after the firemen arrived with two hand engines placed in boats the fire was extinguished.



FIRST FLOATING FIRE ENGINES, GERMANY, 1683

It seems that in earlier times the floating fire engines, especially those employed on the Thames in England, were the property of the insurance associations, for in 1793 one belonging to the London Assurance Corporation was repaired by one of the fire engine firms of London, and in the books of the same firm is another entry for repairs to the floating engine belonging to the Sun Insurance Company in 1803, which, it is said, was at least forty years old at that time.

FIRST ENGLISH FIRE BOATS

In the year 1812 a Mr. Tilley, of London, constructed a floating engine for service in the London docks, which was worked by crank motion, and a second was constructed by him in the year 1840.

Mr. William Baddeley, C. E., was requested by the London Assurance Company in 1827 to inspect their floating fire engine to see what improvement could be made in facilitating its navigation. He prepared a plan for propelling it by means of paddle wheels worked by the same handles or levers as were used to work the pumps, so arranged as to be thrown in or out of gear as required, and in the year 1840 such a floating engine was constructed by Mr. Merryweather for the Russian Government. This boat had a hull 60 feet long by 16 feet beam, in which the engine, provided with three working barrels, 7½ inches in diameter by 14½ inches stroke, was placed. These pumps were worked by four cranked handles, 12 feet long with 18 inches radius, connected to three 6-inch cranks by means of toothed gearing. Each pair of cranked handles was provided with a fly-wheel 6 feet in diameter to equalize the motion. When tried, a 1⅛-inch stream was thrown in a vertical height of 120 feet. It was worked by about fifty men. In 1837 the London Fire Engine establishment added a floating engine to its plant. It consisted of a hull 54 feet long by 16 feet beam and 2 feet 5 inches deep, in which were placed three pumps, each having two working barrels 7 inches in diameter. The levers were so arranged as to give a stroke of 8, 10 or 12 inches of the pistons, as desired. The brakes were crossways of the boat and opened out to 18 feet in length. The suction main had a 5-inch waterway, and the delivery hose, of 3½ inches diameter, was carried on a reel at the stern. With a regular complement of 90 men and a 1¼-inch nozzle three tons of water per minute was projected to a height of 100 feet.

THE FIRST STEAM FIRE-BOAT DESIGNED

Two years prior to this last boat being constructed, Mr. John Braithwaite, engineer of London and who in conjunction with Capt. John Erricson constructed the first steam fire engine submitted a design to a committee of the London Fire Engine Establishment for a steam floating fire engine, but which after some months was returned to him with a letter of thanks declining the same, for the same reasons that they refused his steam fire engine—that it would be too powerful for common use and as the quantity of water thrown might be injudiciously applied cause mischief. A very poor excuse, indeed.

To Mr. Braithwaite is due the credit of first designing a steam floating fire engine, or fire-boat, but he was not the first to suggest their use; that honor belongs to Mr. Baddeley, already spoken of, who was a celebrated writer on and noted inventor of many fire appliances in England, who, in the year 1834, writing to the "Mechanics' Magazine," said: "The ne plus ultra of fire extinguishing machinery would be a steam floating fire engine of about 30 horsepower. The boat an iron one, should be built as sharp as possible

and not to draw above ten or twelve inches of water. The power of the steam engines should be capable of being applied to the pumps or paddles at pleasure."

Mr. Baddeley also suggested that to render such a boat as efficient as possible a small fire should be continually burning so as to keep the temperature of the water at 100 degrees, or 150 degrees. Under such a system the steam might be got up and the paddles started in ten minutes after receiving an alarm of fire.

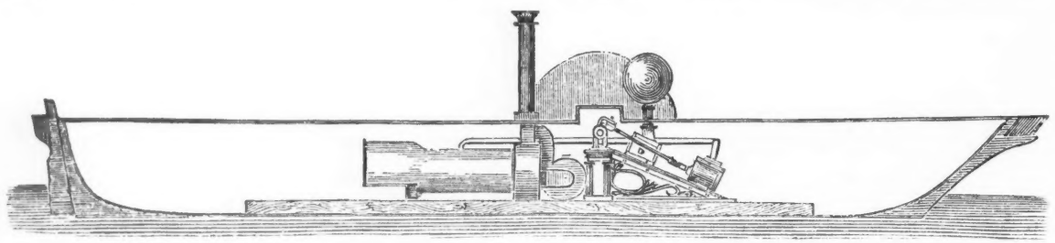
The design of Mr. Braithwaite's, shown in the accompanying engraving and which was made from the original drawings, called for a hull of wrought iron 80 feet long, 11 feet in height, breadth of beam 13 feet, and under decks 7 feet 4 inches, which, with machinery, water in boiler, pumps, and everything complete, to weigh 37 tons. It was to have two steam cylinders, each 16 inches in diameter by 22 inches stroke, and two double-acting pumps, each 14 by 22 inches, capable of throwing from four to five tons of water per minute through nozzles of the following sizes:

3 streams with nozzles of 1½ inches.
4 streams with nozzles of 1¼ inches.
5 streams with nozzles of 1⅛ inches.
7 streams with nozzles of 1 inch.
9 streams with nozzles of ⅞ inch.
12 streams with nozzles of ¾ inch.

The boat was designed to have a speed of 9 miles per hour, and the same engines driving the paddle wheels or working the pumps.

However, the hour for steam-worked fire-boats had not come, nor did it, until the year 1850, when a Mr. P. Clark, the assistant engineer of the West India Docks, placed a pump in one of their tugs, arranged to be driven by gearing from the engine, which propelled the boat. It threw 600 gallons of water per minute 20 feet higher than the highest warehouse in the docks, and with a nozzle of 1½ inches threw to a distance of 160 to 180 feet.

The work performed by this boat evidently had the effect of showing to the managers of the London Fire Engine Establishment, that it was time for them to lay aside their ancient ideas of fire extinguishing and adopt something more modern; for two years later they altered one of the two most powerful floating engines belonging

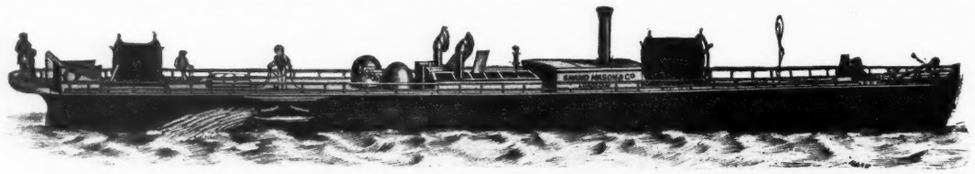


JOHN BRAITHWAITE'S FIRE-BOAT DESIGN, 1835

to the establishment into a steam-worked engine by placing a steam cylinder over each pump, each of which was 9 inches in diameter and connected the pistons by slotted cross-heads and connecting rods, the cranks being placed in the former.

Building of First London Boat

It was proposed to propel the boat by its steam power, instead of oars, and for this purpose the water was carried aft by some arrangement so that the boat might be propelled on the reactive principle, but the result was a failure and the use of oars for propelling was again resorted to. But so great was found the saving in the use of steam power that in the year 1854 they decided to construct and fit up a boat expressly as a floating steam fire engine. Designs were invited and one submitted by Messrs. Shand, Mason & Co., was accepted. It was built of iron and is said to have cost 3,000 pounds. The boat was 105 feet in length, 14 feet 6 inches beam, 7 feet deep with a draught of four feet. The steam cylinders and pumps were placed horizontally, the former being 14 inches in diameter, by 18 inches stroke, the later were made of brass and 10 inches in diameter with the same stroke as the cylinders. As in Mr. Braithwaite's design (although he was completely ignored by the establishment in altering or constructing their floating engines) the engine could be readily uncoupled from the pumps leaving them free to work the propelling machinery of the boat which was a centrifugal pump 3 feet 2 inches in diameter by 9 feet wide placed behind the engines to which motion was given by two large driving wheels. The outlets of the two propelling jets were 12 inches in diameter arranged so as



FIRST FIRE-BOAT, LONDON, 1854

to be reduced if necessary; 3½ inch leather hose was carried on two large reels.

When tried on a measured mile it attained a speed it is said of 8 miles per hour. The estimated power of the pumps was 1,428 gallons per minute, but on trial were found to be 1,938 gallons per minute through four nozzles of 1½ inches to a height of 116 feet and a horizontal distance of 180 feet. This boat which went into service the following year, did duty for a period of about 35 years on the Thames and at the great fire in Tooley street October 28th, 1865, it is said to have worked nearly 400 hours continuously.

A very popular type of floating fire engine in the seaport cities of Europe and especially those of England is made by placing an ordinary land steam fire engine of large capacity on a barge and having the same towed by a tug, but in recent years these are being replaced by very handsome and efficient fire-boats built by the several fire engine firms of England, among which a great rivalry exists.

Double Platoon System for Firemen

The Legislature of New York State has had under consideration the following bill, providing for a double platoon system for the firemen of the cities of the first-class:

Section 1.—The officers, engineers and firemen of the fire department, in every city of the first class shall be divided by the fire commissioner, the board of fire commissioners or other head of such department, into two parts or platoons, the members of each of such parts or platoons to be, as nearly as can be, equal in number, one of such part of platoons to be called the day platoon and the other the night platoon. Except in cases of riot, serious conflagration, general mortality, or other such emergency, during any twenty-four consecutive hours the services of the members of the day platoon shall not exceed ten hours, beginning not earlier than 8 o'clock in the forenoon and terminating not later than 6 o'clock in the afternoon, and the service of the members of the night platoon shall not exceed fourteen hours, beginning not earlier than 6 o'clock in the afternoon and terminating not later than 8 o'clock in the forenoon of the next subsequent day. A member shall not be required to serve in the night platoon for more than six months during any one year of his service in such fire department after this act takes effect. In any of the said excepted cases, such fire commissioner, board of fire commissioners or other head of such department may, in his or their discretion, assign all the members or any of the members of either or of both of the said platoons to continuous service for a longer time than is hereinabove provided, but in no event for more than twenty-four consecutive hours.

New York vs. London Police

THE comparison of New York and London police forces made by Commissioner A. R. Piper as a result of his visit to London for the purpose of studying the police of that city brings out many points of superiority of one over the other. In handling large crowds and in personal courage, the New York police have no equal according to the Commissioner. On the other hand, the London police are far ahead of their fellows in New York in handling street traffic. Commissioner Piper claims that the ordinances are more easily carried out in London because of the larger number of police, seventeen thousand men being on the London force as against seven thousand in New York. London, however, has twice the population of New York and over twice the area to police. The London police are much better officered than those on this side, there being one non-commissioned officer to every seven or eight men, while in New York there is but one to nearly ten patrolmen.

In London sixty per cent. of the force is used at night and forty per cent. during the day, while New York uses fifty per cent. all the time. Another point whereby the London patrolmen are kept up to their work lies in the fact that they are visited about five times during their tour by their superiors. One visit is all the New York police receive.

After about twelve years of work the London police receive a salary of $720 a year. The New York men start at $800. A slight difference is made on account of the fact that the London patrolmen receive their clothing. The police of London are on duty for eight hours per day. The day tours are divided into four hours on duty, four hours off and four hours on. The night tour is one stretch of eight hours, which is relieved by an hour off for supper between half-past one and half-past two. The post is doubled then and the men can go to the stations where a hot meal is served them. The unmarried men live in barracks where they have individual rooms. They have their meals in the station at their own expense and each station has a canteen where food and light drinks can be purchased at small cost.

Politics, which play such a part in the police force of New York, are absent almost entirely from the police of London. The Commissioner is appointed practically for life, which, in Commissioner Piper's opinion, allows of the working out of reforms in a slow, but systematic manner without thought of a nearby election that would cause matters to be hurried.

The London police are very courteous, younger than those in New York, well-informed and intelligent. They are appointed after civil service examinations, but the Commissioner can select whomsoever he wishes of those that pass and can also drop without ceremony those whose records do not come up to the standard. At the age of fifty-five, after twenty years of service, the policeman is pensioned on half-pay. The London police do not drink as much as those in New York and so are kept in better condition and then, too, no free drinks are allowed them. If a saloon keeper sells or gives a policeman a drink he receives a black mark and a renewal of his license is refused.

Commission Piper was much impressed with the way the London police handle the street traffic. They are obeyed implicitly when an order is given and will allow no "back-talk" from drivers. If a man gets on the wrong side or disobeys the rules he must get right at once. If he be on the wrong side he cannot cross over but must go around the block. His number is taken and he will have to pay for his act. He is told to appear in court—and he appears. Each driver is examined as to his ability. The merchants are not permitted to block the sidewalks with goods as is the case in New York, and the man on post must see to this under penalty of being dropped from the force. Heavy trucking, too, is not allowed between ten o'clock and four.

There is an esprit de corps among the police of London that prevents any widespread corruption. If there is any bribe-taking or rascality among the officers, their fellow officers find it out and report to the Commissioner. The offenders are quickly gotten rid of without ceremony.

The London method of handling the traffic is now being tried at congested centres in New York and thus far the results have been most satisfactory. When the drivers become used to the method, there is no reason why there should be more confusion in New York than in London.

To Regulate Binghamton's Police

THE Legislature of New York State has been asked to pass an amendment to the charter of Binghamton, N. Y., regulating the pay of the police. The bill provides that the force of the city is to consist of the chief of police, at a salary not to exceed one hundred dollars per month; two assistant chiefs of police, who shall act as roundsmen, at a salary not to exceed eighty-five dollars per month each, and nine patrolmen, at a salary not to exceed sixty dollars per month for each patrolman, but said board may, at its discretion, increase the salary of any patrolman, five dollars per month above said sixty dollars (for each) after the first five years of continuous service on the force. After each additional two-year period of continuous service, the salary may be increased five dollars per month until the salary of the patrolman shall reach seventy-five dollars a month.

The number of men shall never exceed the rate of proportion of one patrolman to every 1,000 of the inhabitants. The board may appoint two officers to be known as detective sergeants at salaries not to exceed seventy-five dollars a month. Special policement may be appointed when necessary, but no regular officer shall be removed by a majority vote of the board except after a fair trial upon written charges. The majority of the board may suspend an officer without pay on charges for inefficiency or misconduct. A unanimous vote of all the commissioners or a concurrent vote of three commissioners and the mayor is to be sufficient to remove an officer without specifications.

New Regulations for Tampa Firemen

NEW rules have been adopted by the Council of Tampa, Fla., for the government of the Fire Department, that are calculated to not only greatly improve the service, but also prevent the possibility of any strike, such as lately threatened the safety of the city.

All appointments are to be made according to merit. The fire Committee will form a commission to hold examinations and while the chief is to assist, he is to have no say in making up the eligible list. Preference is to be given to the men now in the department and then to the former firemen who left the service voluntarily. Five days' notice is to be given of any examination.

Applicants must be citizens of the United States, residents of the State six months, county three months and city one month. They must not be less than five feet six inches in height and weigh between 135 and 205 pounds. They are to be examined as to their moral character, physical and mental ability and technical knowledge of the service. The last will not apply to present members of the department. The city physicians are to perform the physical examinations and references must be furnished from three reputable business men as to the character of the applicant. The United States Civil Service Manual of 1903, is to be the basis on which paper are to be passed and 70 per cent. must be atained before the applicant will be placed on the eligible list.

This list is to be certified to the chief, the commission designating the number of men to be appointed and the chief must take the names in regular order of merit. The chief will fill all vacancies from the list and if it becomes exhausted, another examination is to be held.

Firemen are not to perform any duties not required by the rules of the department. Any grievances against the chief are to be reported by the one holding them to the mayor who will investigate and prefer charges. The commission is to have the power to investigate any charges made against officers in the service. Firemen must give thirty days' notice of resignation and if any reduction is necessary in the number of men, those whose records are least meritorious shall first be removed. No fireman is to become an officer in any political organization or campaign movement, but shall have the right to vote and express views. No fireman shall join any union or such organization and no member of any union or organization shall be placed on the eligible list. Firemen joining any union or organization shall be removed at once.

WHAT POLICE AND FIREMEN ARE DOING

Protect Firemen from Electric Current—Fire Drills in Schools—Barbers Must Be Clean—Fall River Police Active—Improvements Needed in New Orleans Fire Service

To Pension Saginaw Firemen

THE charter amendment committee of Saginaw, Mich., has been asked by the friends of the firemen to make provision for the pensioning of the men. It is proposed to retire the aged and disabled men on half pay and to pension the widows, children and those dependent on men killed in the service. After a man has served twenty-five years, the council is to have the power, by a two-thirds majority, to retire him after a physical examination has shown him unfit for service. Similar means are to be taken in case of those injured, although if, after retirement, a man is found capable of service, his allowance can be stopped and he must return to work.

In case of a man killed in discharge of his duties or dying within one year of receiving injuries, the council can allow his widow a pension of $300 a year for five years unless she remarries, when it is to stop. If there be no widow, children under sixteen years are to receive the same benefit.

Fire Drills in Schools

THE Building Code containing the laws and ordinances of Albany, N. Y., presents the law relative to fire drills in schools. The principal in charge of every school, public or private, within the State must instruct and train the pupils by drills so that they will be able to leave the building in the shortest possible moment without panic, and such drills must be held at least once in each month. A fine of $50 is the penalty for neglect of this rule, and the money is to go into the pension fund of the firemen if such fund exists. The provisions of this act do not apply to colleges or universities or to schools containing less than 100 pupils.

New Liquor Laws for Chili

IN an attempt to cope with inebriety, Chili is trying the effect of a new code of liquor laws, some of the clauses in which are of a distinctly novel and drastic character. For instance, sales and advertisements of distilled and fermented liquors are prohibited in theatres, circuses, and other places of amusement, and in railway stations and trains. Any person found intoxicated in any public place is, under the new law, subject to from three to five days' imprisonment. At the third offence the culprit will be liable to from eight to thirty days' imprisonment. The law in regard to intoxicated persons is of a most comprehensive character, having special reference to the occupation of the culprit and his behaviour; and specially drastic penalties are laid down for all kinds of public officials who may contravene the law. A husband, or the father of a family, who may have become so addicted to drink as to be unable to manage his business or support his wife and children may be sent, on the petition of any member of the family, to an asylum for inebriates for from three to twelve months.

Rules for Jersey Barbers

THE Board of Health of Jersey City, N. J., has adopted an ordinance which is designed to insure sanitary methods in barber shops. It is said that the best class of barbers is in sympathy with the new regulations, and that they will aid in carrying them out. A penalty of $10 is to be paid for every violation of the ordinance.

The ordinance provides that the floors and woodwork in barber shops shall be scrubbed at least once a week. A barber must sweep out every day. He cannot allow anybody to sleep in his shop or permit any employe to treat any customer for a skin disease, unless the barber is a licensed practising physician.

All barbers must keep their finger nails short and clean. He must cleanse his hands thoroughly immediately after waiting upon a customer. He cannot under any circumstances blow short hairs from a man's neck after giving him a haircut. Instead he must use a towel or a fine hairbrush in removing the "ticklers." The brush, as well as razors, combs and other "barbers' tools," must be sterilized in hot water or a solution of formalin within five minutes after use. This is considered essential to kill stray microbes. The barbers are warned not to wipe their hands upon or blow their breaths upon razor strops while putting edges on razors. Particular stress is laid upon the necessity of giving every customer a towel which is warranted to be perfectly clean. The barbers will be allowed to have cuspidors in their shops, but they must have wide openings without any bevelled or rough sides. The cuspidors must be disinfected every day.

Electric Current Cut Off During Fires

IN the course of the year, 145 alarms were answered by the firemen of Charleston, S. C. Four of these were for assistance out of town and were as promptly answered as were those within the city's limits. Chief O. G. Marjenhoff reports that the discipline in the department has been good, but that some of the members have been tardy in answering alarms and he recommends that such rules be made as are necessary to overcome the trouble. The lowest number of men arriving with the first apparatus on the ground is not up to the standard and the Chief threatens to replace the tardy ones with those who will take more interest.

The emergency wagon of the street railway company answers every alarm and the Chief praises the work of its men. Signals have been adopted for the cutting out at the power house of all electric circuits in the vicinity of fires. Six taps is the signal to cut out circuits and three taps the signal to turn on the circuits again. By this means the danger from deadly electric shocks is removed and the firemen can be free to work without fear.

At present the force consists of ninety-nine officers and men, ten steamers, one double eighty-gallon chemical engine, twelve hose wagons and carriages, an aerial truck, two other trucks, a complete alarm telegraph and minor equipment. The work of the police is commended in aiding the firemen, extinguishing small fires and sending alarms by telephone in place of by the box, thus saving much wear on the apparatus.

Underwriters Recommend Improvements in New Orleans

THE National Board of Fire Underwriters has made some recommendations to Mayor Capdeville and the Fire Commissioners of New Orleans respecting additions and improvements in the fire service of the city. Two additional firemen should be attached to all the companies in the business districts and one fireman to those in the outlying sections. In the business section there should be three additional companies to man a steamer, a chemical engine and a truck. In engine house No. 5 there should be a first-class steamer, a combination chemical and hose wagon, an aerial truck and a chemical engine of double eighty-gallon cylinders. There should be an additional company to operate a first-class fireboat to patrol the fifteen miles of river front. To replace the defective hose now in use, 8,000 feet of hose should be purchased.

An inspector of buildings is necessary, according to the Underwriters, to investigate the cause of all fires and suitable laws should be enacted to prevent the erection of frame buildings in the fire limits. Permanently attached keys should be placed on all alarm boxes in the business section. A system of water supply with delivery mains sixteen inches in diameter and laterals on cross streets of ten to twelve inches, should be laid. Special hydrants should be placed on these mains and a pumping station should be erected to supply these mains directly.

Firemen's Monument at Berlin

A MONUMENT has been erected by the city of Berlin to the memory of firemen who have lost their lives in discharge of their duty.

The dedication ceremony was in the presence of the Minister of the Interior, the chief military and civil authorities connected with the city and a very large number of fire brigade officers and men.

In unveiling the monument, Dr. Kirschner, the chief burgomaster, said: "It is a landmark of deep gratitude to the men who, in faithfully fulfilling the duties of their calling, lost their lives for the safety of their fellow citizens. At the same time, the monument is to mark our gratitude to the whole of the Berlin fire brigade, which has just completed the fiftieth year of its existence."

The chief feature of the monument is a marble sarcophagus, on the sides of which are depicted the struggle of the elements and the chief features of the fireman's work and life.

On bronze tablets, placed in a conspicuous position, are engraved the names of Berlin firemen who have already lost their lives while performing their duty.

The monument is flanked by two high pillars, from which flames are represented as proceeding.

France to Hold Firemen's Competition

REPORTS from Havre, France, state that on May 31 and June 1, an international fireman's competition is to be held under the auspices of the mayor and distinguished citizens. The exercises will consist of maneuvers of engines and trucks, etc., and the juries are to be composed of French and foreign firemen who are in active service. There will be prizes for the best work and for the company presenting the best appearance as to its personnel and apparatus. Organized fire departments all over the world are invited to attend or send representatives. All information regarding the details of the competition, etc., can be obtained from R. Duchemin, president of the organization committee.

Increase in Arrests by Fall River Police

THE police force of Fall River, Mass., is composed of 130 officers and men including a marshall, assistant marshall, four captains, four inspectors and six lieutenants. According to the report for last year, there were 4,973 arrests, an increase of 660 over the preceding year. Of this number 4,146 were male and 827 female, 3,026 being foreigners and 816 non-residents. The number of arrests show an increase of 18.15 per cent. over the number of arrests for the seven years from 1895 to 1901. The number of arrests for the year is 4.57 per cent. of the population, an increase of 0.35 per cent. over the average percentage for the average population for the seven years mentioned. There was an increase in arrests for drunkenness but a decrease in the number of those given lodgings. The arrests of juveniles have increased considerably, being 40.3 per cent. over the average for the seven years previously given. There were 106 licenses granted for the sale of intoxicants, the law providing that the number of licensed places shall not exceed one to each 1,000 of the population.

Automobile Chemical for Leicester

ACTING on the recommendations of Chief William Ely, of the Leicester (Eng.) fire brigade, the city will procure an automobile chemical engine. When he visited America last fall, Chief Ely was impressed with the great value of such a machine for small fires, often obviating the necessity of using the other engines. The machine is to be of sixteen horse-power with a fifty gallon chemical tank and will carry hose for hydrant service, pompier ladders and smaller appliances. Another recommendation of Chief Ely was for a salvage corps, but the insurance companies, strange to say, refused his request.

To Stop Filthy Spitting Habit

RENEWED agitation has been started against the expectorating habit and cities have been passing ordinances imposing penalties for violations of the regulations. In McKeesport, Pa., the general manager of the street railway has stated that it was difficult to enforce an anti-spitting regulation because there was no city ordinance prohibiting expectoration. The Board of Health, however, has been considering such an ordinance, and it is expected that it will be put in force in the near future. The House of Delegates of St. Louis has passed Mayor Well's sanitary measure prohibiting spitting in the street cars, on sidewalks and in public places. A penalty of from $1 to $5 is to be imposed for violations. The Council of Philadelphia has passed a similar ordinance against spitting with the same fines attached as in force in St. Louis. The Public Health Department of London, Eng., has been carrying on a crusade against the filthy habit of spitting in public places. Circulars were issued asking for co-operation in preventing as far as possible the habit. Both Liverpool and Glasgow have ordinances against spitting in cars.

Toronto Firemen's Union Dissolved

AFTER a series of discussions and conferences, the firemen of Toronto, Ont., recently decided to disband the newly formed union known as the Firemen's Mutual Benefit Association No. 7 which was affiliated with the other labor unions of the city. For some time it looked as if trouble would arise in the department on account of disagreements between the union members and Chief Thompson, but the Chief put the matter so clearly and showed the men so well the utter absurdity of a union among firemen, as told in the February issue of THE MUNICIPAL JOURNAL, that they voted to disband. The action of the men is commendable and showed marked moral courage inasmuch as they had theretofore assumed such a determined stand in favor of continuing the union.

Should Have Hose Towers and More Apparatus

IN the opinion of Chief James J. Dougherty every engine house in Terre Haute, Ind., should be equipped with a hose tower. He constructed a tower in one of the houses and the results have been most satisfactory. Each company should have two sets of hose so that one could be drying while the other is ready for service. Chief Dougherty recommends that a combination chemical engine and hose wagon be purchased as well as a hook and ladder truck and two steamers for the demands on the present apparatus is so great that they are not able to meet the requirements. At present the aerial truck has to answer all the alarms and many long runs are the consequence. Another truck would allow the aerial to attend to the business sections of the city. The new steamers he would place in the business portions to reinforce those there at present. The repeater of the fire alarm telegraph should be replaced in the opinion of the Chief and a storage battery should be put in to take the place of the present system.

Toledo Needs More Engines

THE total pumping capacity of the steamers of the city of Toledo, O., is entirely inadequate for the needs of the city according to the last report of Chief Mayo. Only 6,500 gallons a minute can be thrown by the engines now in use, whereas a city the size of Toledo should have engines with a pumping capacity of at least 15,000. He recommends, therefore, the purchase of five additional steamers as soon as possible. He thinks that the city should have a fire-boat and the installation of auxiliary pipes and hydrants inasmuch as the city has sixteen miles of water front with no protection. Since 1893 the necessity for a fire-boat has been pointed out in the reports of the present chief and his predecessor but no action has yet been taken on the recommendations. Two hook and ladder trucks should also be purchased as the districts covered by the present trucks are too large for them to give efficient service. One other recommendation is made and that is the erection of an engine house equipped with a combination chemical engine and hose wagon, steamer and hook and ladder truck.

Hospital Camp for Consumptives

IT has been the plan of the Commissioner of Health of New York City, Dr. Ernest J. Lederle, to establish, within a couple of hours' ride of the city, a camp of tents for the consumptives of the city. The city has the right to erect a hospital for consumptives outside of the city and the Commissioner desires to take advantage of this right. A lot of statistics have been collected by the department covering the last ten years and show that the death rate from pulmonary diseases has been considerably reduced. Last year the reduction was

ten per cent. and the Commissioner is to have 75,000 circulars printed in every language and distributed by the Charity Organization Society to every house in the poor districts. This circular will make practical suggestions as to the care and treatment of consumptives and the precautions to be taken to prevent contagion. Little, however, can be done for a sufferer in a squalid tenement and so the city must establish a hospital. The Commissioner favors the camp idea. He desires to have the city buy a tract of land of 100 acres in the nearer portions of the Catskills and on a side slope, so that different altitudes may be utilized, put up tents. The tents will be occupied throughout the year, will be rain-proof, have board floors and be divided into three parts. The front is to be a sort of balcony where the patients must spend pleasant days, the next to be for sleeping and living. In the rear is to be a boarded structure in which food and clothing can be kept. In cold weather the tents are to be heated. The camp hospital will be inexpensive when compared with a large permanent hospital. A start could be made for $75,000 and, as the needs increased, more tents could be erected at slight expense. There are about 25,000 consumptives in the poor sections and something must be done to check the spread of contagion.

The free use of a ninety-acre farm in Orange county for two years has been offered to the Commissioner for his experiment and the Health Board has asked that $35,000 be appropriated for the establishment of the camp.

Engine No. 8

Fire!
Over the bridge, through the steam of the trains,
Through the mist and the rains
And the black, oily street—
With the sound, hoarse and shrill, of the whistle blown first,
And the sudden wild burst
Of the galloping feet—

A swerve round the corner, a shout to the horses,
The clamor and clang of the sharp-swinging bell—
Ahead, streams of traffic stopped short in their courses;
Behind, hurried footsteps that follow pell-mell—

Far down the street, rolling wide in its track,
With the smoke floating back
And the sparks flying fast—
With the red trail of coals and the jolt and the jar
Dying dully afar,
So the engine goes past!
Fire!

—Caroline Duer, in *Scribner's*.

FIRE AND POLICE PERSONALS

—Mr. Thomas M. Burckes has been re-appointed marshall of the police department of Lynn, Mass., by Mayor Eastham.

—Chief of Police Wright, of Syracuse, N. Y., has been able to resume his duties after a serious illness of over two months.

—Chief Charles H. Thorne, of the fire department of Port Huron, Mich., has resigned on account of friction that has been in the department for some time.

—The Socialistic party in Lansford, Pa., which is in control of the town that has elected Thomas Barber chief of police. He was a strike leader in the recent coal strike.

—As the result of the Democratic primaries in Birmingham, Ala., Captain W. E. Weir has been nominated for the position of chief of police in place of Chief Austin.

—Colonel Paul Millikin has been nominated by Mayor Fleishmann to succeed the late Philip Deitsch as superintendent of the Cincinnati, O., police force. The police board unanimously confirmed the appointment.

—Dr. Amos Fox has been elected as the head of the board of police commissioners of Atlanta, Ga., and his election was taken as a positive assurance that Chief Ball would be elected chief of the police force.

—Chief of Police Thomas V. Thompson, of East Liverpool, O., is a candidate on the Republican ticket for mayor of the city. If elected he will be the first mayor under the new code and will receive a salary of about $3,000 a year.

—Chief Swingley, of the St. Louis fire department, celebrated his thirty-fourth anniversary of appointment to the service on March 3. Since his entering the department he has seen it develop from one having but nine engines up to the equipment of thirty-nine at the present time.

—Chief of Police Kuemmerling, of Hamilton, O., has signified his intention of resigning to accept the position of collector for a brewing company. On account of recent trouble it is probable that Chief Kuemmerling would have been forced out after the coming election had he not anticipated matters by resigning.

—Chief Fred K. Krauth, of the fire department of Alameda, Cal., has recommended that a paid department be installed in place of the present volunteer system. He claims that the paid department would not cost the city any more than the volunteer service does, although the estimate for the former is $40,000 a year.

—Mayor E. B. Joseph, of Montgomery, Ala., has given orders to Chief Browder not to go to any fire outside of the city limits that is over 500 feet from a hydrant. Inasmuch as the people of Montgomery have to pay for the fire service the Mayor does not see why those who do not pay should receive protection from fire.

—Captain John H. Dameell, who has been the building inspector of Boston since 1877, and who was chief of the fire department for eight years, from 1866 to 1874, has resigned. He had been a member of the fire department for many years. He organized the International Association of Fire Engineers and was its first president.

—City Commissioner H. L. Lilienthal, of Spokane, Wash., has resigned and will leave public service. He was Commissioner of Streets and Police. He installed the department of sidewalks and saved the city much money in his handling of affairs. He will become superintendent of a street railway system to be introduced in the city by Mr. A. J. Graves.

—Chief R. W. Dutton, of the fire department of Washington, D. C., has been legislated out of office and will retire on July 1. Congress decided that a fireman should be at the head of the department and as Chief Dutton had had no experience in the service, having been a newspaper reporter when appointed by Commissioner Macfarland two years ago, he was forced out of the department.

—Chief Ahern, of the Quincy, Ill., police department, has opposed the proposed law to place the fire and police department of Illinois cities of over 7,000 population in charge of a board of police and fire commissioners. He considers the idea a bad one as tending to place the department in politics. Strange to say, the annual convention of the Illinois Police Association favored the passage of the law.

—The bill raising the salaries of the Chiefs of the fire departments of Trenton and Jersey City, N. J., has been passed and signed. Chief Conway, of Jersey City is now to receive $3,000 a year in place of $2,500 as heretofore. Assistant Chief Engineer Lovell is to receive $2,500 and the battalion chiefs $2,000. All the other salaries in the department are to increase at the rate of 5 per cent. for three years.

—Chief Horton, of the Baltimore, has proposed a plan whereby mechanical ventilators are to be placed in the roofs of elevator shafts to permit of the exit of smoke in case of fire. He claims that this would aid in preventing the spread of fire. The Insurance companies require the closing of all elevator shafts at each floor during the night and this plan of the Chief would seem to be in contradiction to the views of the companies.

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

In the endeavor to determine the best method of construction to secure fire-proof buildings, the British Fire Prevention Committee has carried out numerous and elaborate tests with all kinds and conditions of building material. The results of the investigations made by the Committe are embodied in two volumes of *Facts on Fire Prevention,* edited by Edwin O. Sachs. Much is claimed by the manufacturers of different structural materials that absolute fire-proofing is attained by the use of their materials, but the tests to which these materials are subjected by the Committee's experts will bring out all the good and bad points of the materials notwithstanding the claims. It is on this account that every chief of fire department in the world, every architect, every official that has to do with the building departments of cities should read carefully the results of tests as given in these two volumes. Should the information contained in this work be put into practice, there is not the slightest doubt but that the loss of life and property that is daily being sacrificed to poor building construction, would be in a great measure prevented.

After general introduction showing how the Committee was formed, its scope and the experimental work that it has been doing and the methods employed, the first volume takes up the experiments with floors of wood, steel, expanded metal and concrete, etc.; tests with ceilings of different kinds, and tests with partitions of lath and plaster, brick and various patented material. Tests were also made with "non-flammable" wood. Volume two is devoted to the tests made on doors of different kinds of wood and of iron. Experiments were made with various kinds of glass and other glazing materials. The final work was to carry out a series of tests on curtains and blinds. The work throughout is finely illustrated with half-tones and diagrams showing the tests and results and printed on heavy calendered paper. Charles Scribner's Sons, New York, have imported this work from London, and the price is, in cloth, $10 per set of two volumes.

The result of the observations made by George W. Parker, Chief Officer of the Manchester (England) Fire Brigade, while on a visit to the fire departments in America, is embodied in a small book entitled *Fire Brigades of America.* Chief Parker visited the fire departments of Boston, New York and Philadelphia, and describes for the benefit of his city council and other English officials how these several departments are run, pointing out where they excel his own department and where in turn his own is better than those he visited. All of the appliances in use in the American departments are not, in his opinion, available for Manchester. The papers read at the convention of the International Association of Fire Chiefs held in September last in New York are included in this pamphlet, Chief Parker having attended the convention with three of his English contemporaries.

For the purpose of securing more uniformity in the forms and dimensions of cast-iron water pipe as well as in methods of manufacture, the New England Water Works Association appointed a committee to draw up a standard form of specification and patterns and the report of this committee is issued by the Association in a pamphlet under the title *Standard Specifications for Cast-Iron Pipe and Special Castings.* Great care was taken by the committee in drawing up the specifications and the pamphlet should be received by engineers and manufacturers with satisfaction. The Association asks that these specifications be used by engineers in ordering pipe for work under their charge. Copies can be obtained of the Secretary of the Association, Mr. Willard Kent, 715 Tremont Temple, Boston, Mass., for 10 cents each.

Creo-resinate Wood Pavements for Streets and Bridges takes up the subject of wood paving made after modern methods. The author, Mr. F. A. Kummer, shows how this kind of pavement has stood the test of the heaviest traffic that a pavement could have. From a table in this little book showing the amount of traffic that is sustained by the most travelled streets in the world, four of the seven streets at the top of the list are paved with wood block. The creo-resinate process of treating wood for pavements is explained and then Mr. Kummer takes up the use of wood paving on bridges showing that the wood, besides being equal to any other paving in durability, is very much lighter. Illustrations are given showing where this kind of paving has been laid. Published by the United States Wood Preserving Company, New York.

Periodicals

The Hartlepool Destructor Works are described fully in the March 13 issue of *The Surveyor,* and numerous diagrams and half-tones show the interesting points of the works and their plan. London, Eng. Price per copy, 3 pence.

Leslie's Weekly for March 19 has a story about the marvelous growth of Pittsburg, Pa. Were the towns and cities in the immediate vicinity of the city united with it, as will be the case in a few years, Pittsburg would be the fourth city in the United States in point of population. In point of wealth and business activity it holds a much larger place in the country than in population. New York, N. Y. Price per week, 10 cents.

The issue of the *Municipal Journal* for March 6 has an interesting article on the work at Kensington and Chelsea and Ravenscourt among the children who have no one to care for them or whose parents are criminals. The work to make these pauper children grow up to be good children is meeting with success as far as may be judged thus far. Among the other articles on municipal subjects is one entitled *Cottages from Clinker.* Liverpool is experimenting with the erection of workingmen's houses from the clinker thrown out by the refuse destructors. The issue of March 13 describes the *Hornsey Electric Light* plant, a municipal undertaking that is meeting with success despite predictions to the contrary. The scheme is comparatively new although the district has been endeavoring to secure the money for the plant for some time. The exhaust steam from the boilers is to be used to heat the municipal baths that are to be erected soon. London, Eng. Price per year, $2.16; per copy, 2 cents.

The March issue of *The Arena* contains an article by Mr. W. S. U'Ren on *The Initiative and Referendum in Oregon..* He speaks of the work of the Direct Legislation League in pushing its system throughout the State, and shows some of the advantages that accrue to the adoption of this system of reviewing the action of the legislature. New York, N. Y. Price per year, $2.50; per copy, 25 cents.

Insurance Engineering for February contains a number of articles of interest to building departments. There are articles on the *Preservation of Steel,* used in building construction, a description of the construction and fire proofing in the Government Printing Office at Washington; an article by Frank B. Abbott on the *Evolution of the Fire-Proof Building,* and one by Edward Atkinson on *Pipe and Hydrant Service.* New York, N. Y. $3.00 per year; 25 cents per copy.

A description of the opening of the *Municipal Tramways at Rotherham, England,* is given in the issue of *The Municipal Journal* for February 20th. *The Problem of the Children* is the subject of another article, showing *how the city* of Croydon is taking care of the

younger generation. London, England. Price per year, $2.16; per copy, 2 cents.

Considerable space is devoted in the March number of the *National Magazine* to a description of cities. Hamilton Wright contributes a story about *Los Angeles. Toledo, the Third City of the Fourth State,* is described by Kevin C. O'Dwyer. *Milwaukee,* by William F. Hooker, and *Bangor, Maine,* by Edward M. Blanding, Secretary of the Board of Trade, are other articles in this number. Boston, Mass. Price, $1.00 per year; 10 cents per copy.

The March issue of the *Canadian Horticulturist,* in its department on *Civic Improvement,* speaks of the organization of the Canadian League of Civic Art, which was formed in Toronto in February, 1903. This League will comprise representatives of the Society of Architects, the Society of Artists, the Fruit Growers' Association of Ontario, The Ontario Horticulturist Society, the Toronto Board of Trade, the Good Roads Association and many other similar bodies. The purpose of the Canadian League is to be a bureau of information to help all civic improvement bodies without interfering with their work. It would bring people together who had ideas on certain subjects, and would spread the information obtained to all parts of the country. Hamilton, Ontario. Price per year $1.00; per copy, 10 cents.

A comparison of the police systems of London, Paris and New York is given in *The Cosmopolitan* for March in an article on the *Police Systems of Europe,* by Avery D Andrews, former Police Commissioner of New York City. Mr. Andrews shows that in Paris there is one policeman to every three hundred and seven inhabitants; in London, one to every four hundred and eight, and in New York, one to every four hundred and fifty-eight. Comparing the portions of police to areas, Paris has two hundred and sixty-six police per square mile; London, twenty-three, and New York, twenty-five. The superiority of the London police over all others is brought out by Commissioner Andrews, due in part to the former absolute government. The populace of London and of Paris show greater respect to the police officers than is apparent in New York. This is only one of the many reasons why the London police are more successful than those of New York in preserving order. The police of European cities are largely removed from local politics, which is a great advantage. The author pays tribute to the admirable way in which the police of London manage traffic, a wave of the hand being sufficient to enforce any order that an officer may see fit to give. Irvington, N. Y. Price per year, $1.00; per copy, 10 cents.

A description of the *First Parliament of Australia* and of the work that is being done by the newly formed government there, appears in the March issue of the *American Review of Reviews* under the authorship of Hugh H. Lusk. Mr. Lusk tells of the progress of municipal ownership in Australia and pays special attention to the ownership of the telegraph which is run in connection with the post office, and of the telephone exchanges. The latter has not been developed as fully as the former, but it is hoped that within the next few years the extension of long distance telephone lines will be rapidly pushed under the direction of the post office department. The cheapness of the telegraph messages is surprising when compared with prices paid in the United States for similar distances. Messages can be sent some four thousand miles for the same price charged by American companies for local service. New York, N. Y. Price, $2.50 per year; 25 cents per copy.

The Shamelessness of St. Louis is the subject of an article in *McClure's Magazine* for March, by Lincoln Steffens. The author, as in his previous story on the "Shame of Minneapolis," brings out the fight that Circuit Attorney Folk has been making to punish the boodle aldermen. This article is supplementary to the previous article in McClure's, by the same author, on "Tweed Days in St. Louis." The utter supineness of the people of St. Louis in regard to the disgraceful state of affairs in the city is something that can scarcely be comprehended, according to Mr. Steffens. New York, N. Y. Price, $1.00 per year; per copy, 10 cents.

The Quarterly Journal of Economics for February contains, among notes and memoranda, a discussion of *Ground Rent* by Arthur J. Boynton, and the *Holyoke Water Case,* by Chester W. Wright. In the latter the author reviews the taking over by the city of Holyoke, Mass., of the plant and discusses the two main points at issue, viz., what is to be included in the plant to be sold, and how that plant should be valued. It is announced that a future number of the *Journal* will contain a fuller account of the cost with an analysis of the decision and the principles upon which it was based. Boston, Mass. Price, $3.00 per year.

The March issue of the *Annals* of the American Academy of Political and Social Science contains a number of articles of interest to municipal officials. *The New Australian Commonwealth* is the subject of an article by W. Harrison Moore, who tells of how the newly organized government of Australia was formed and how local governments were consolidated. *Constitutional Government in Japan* was contributed by Ernest W. Clement. James T. Young of the University of Pennsylvania writes about the *Basis of Present Reform Movements,* in which he discusses the fundamental question, "What Determines the Amount of Time and Attention Which People Give to Political Affairs." Clinton Rogers Woodruff, contributed an article on the *Nationalization of Municipal Movements,* speaking of the formation of various municipal organizations and of the work that they are carrying on. The closer co-operation between the several bodies in Mr. Woodruff's opinion, should not at the present time be carried out, but the appointment of a permanent secretary to serve all of the associations, could be undertaken without delay, and without fear of any misstep being made. Robert H. Whitton writes on *The Political and Municipal Legislation in 1902,* in which he reviews what has been done in the various cities of the country. Among notes on municipal government appear contributions concerning the *Water Supply of New York, Uniform Accounting in Boston, Tenement House Conditions in Buffalo, Financial Conditions of Cincinnati and Providence,* the *Gas and Water Plants of Duluth and Superior, Wis.,* and *Municipal Ownership in Wyoming.* Local Government in Berlin and Franchises of Underground Railways in Paris are added to the list of notes. Philadelphia, Pa. Price, $6 per year; $1.00 per copy; issued bi-monthly.

Municipal Reports Received

We received the sixth semi-annual report of the Sewerage and Water Board of New Orleans for the last half of 1902.

The report of the New York State Electrical Laboratory Commission on the establishment of an electrical laboratory, has been received, as well as report on the spirit levels of the New York State Barge Canal Survey for 1900 and 1901.

We have received the following annual reports of cities. Bessemer, Ala., for 1902; Duluth, Minn., for 1901, with the compliments of W. B. Patton, City Engineer; Winchester, Mass., with the compliments of E. D. Fletcher, Superintendent of Sewers.

We acknowledge the receipt of the following: The annual report of the Water Board of Leominster, Mass., for 1902-3; the twenty-fifth annual report of the Board of Water Commissioners of Johnstown, N. Y., for 1902; the fourth annual report of Water and Light Department of Duluth, Minn., for 1902; the annual report of the Water Commissioners of Binghamton, N. Y., with the compliments of Mr. John Anderson, Secretary and Superintendent; the seventh annual report of the Board of Public Works of Poughkeepsie, N. Y., for 1902; the annual financial statement of the city of Shreveport, La., for 1902; the report of Fire Masters of the city of Charleston, S. C., for 1902.

Annual report of the Water Department of Rockford, Ill., for 1902; report of the Board of Health of Lowell, Mass., for 1902; report of the Health Officer of the District of Columbia for 1902; report of the engineering commission appointed by the Water Works Trustees of Toledo, O., regarding an improved water supply; the annual reports of the town officers of Fairhaven, Mass., and the annual reports of the city of Rockford, Ill., sent us with the compliments of City Engineer Edwin Main.

ROAD BUILDING AND REPAIRING OUTFIT

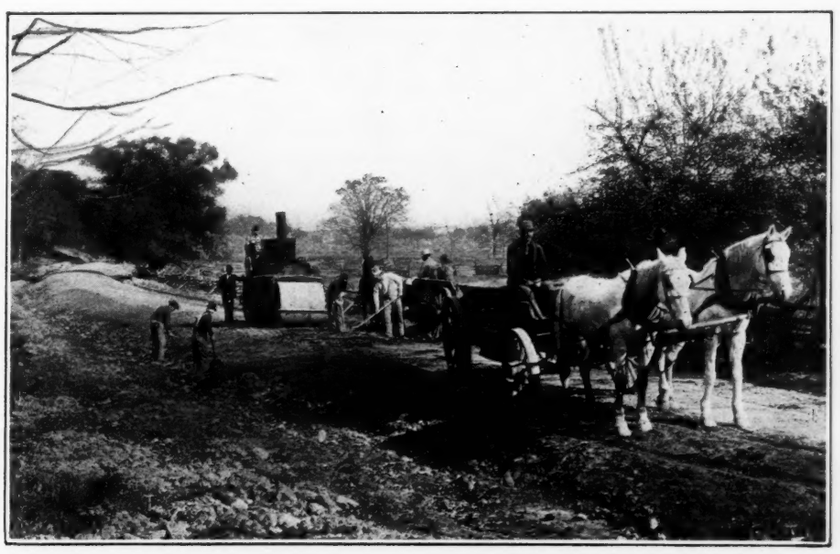
A Description of the "Universal"—Can Be Used as Traction Engine, Power for Stone Crusher, Etc.—Has Unique Features

It is quite the fashion now-a-days for American cities to follow the good example of English municipalities in owning and operating complete road building and repairing outfits. This practice was first taken up about twenty years ago by a few small New England cities and has since become quite popular in that section, even among some of the larger municipalities. Besides, there are many cities throughout the country which have found it advantageous to own such plants, using them not only for the construction of macadam streets and roadways, but also in the building of foundations for other streets as well as using the rollers in laying brick pavements. In this way many thousands of dollars are saved annually, thus allowing larger sums to be expended upon street improvements. For this reason we have adopted the custom of describing the well known outfits, which are especially adapted for this work.

UNIVERSAL ROLLER RUNNING STONE CRUSHER—COMPLETE PLANT FURNISHED BY JULIAN SCHOLL & CO.

The accompanying illustrations and description of the "Universal" steam roller, built by Julian Scholl & Co., 126 Liberty street, New York, will interest our readers, because it has structural points differing from all other types of rollers.

The "Universal" roller has been on the market for the past two or three years and has proven an efficient and economical machine on all kinds of street and road work. This roller was no named because of its adaptation to the varying local conditions and the requirements for all kinds of street and road construction, such as gravel or macadam, the sub-grade for asphalt, brick or any other kind of pavement requiring the use of a roller. This roller is built in all sizes, from three to twelve tons, which makes it possible for the purchaser to select one adapted to his particular needs. The roller is especially useful to a city or county because it can be utilized to furnish the power to run a stone crusher or similar machinery, or as a traction engine; for all sizes of this roller are provided with draw bars so that the roller can be used to pull a portable crusher or loaded wagons.



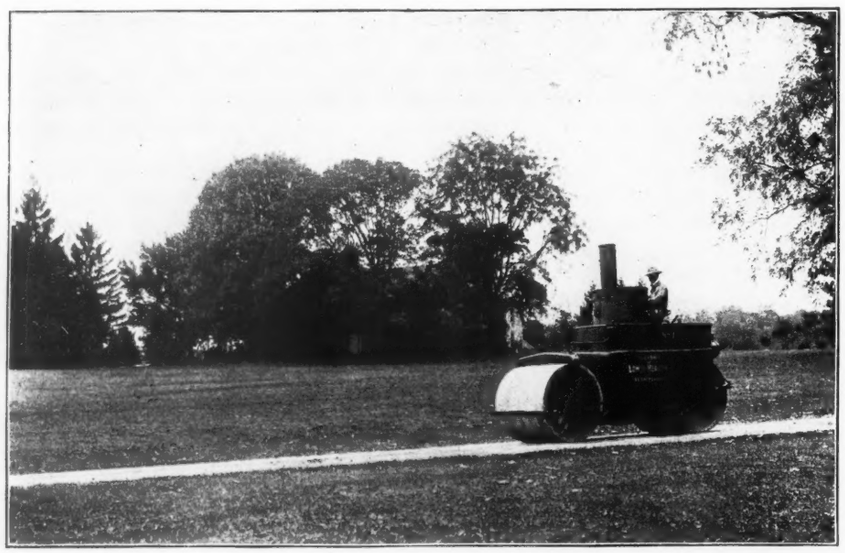
BUILDING STATE ROADS IN ORANGE CO., NEW YORK

Besides differing in general design from other rollers, the manufacturers claim to have embodied practical time and labor-saving devices in the operating mechanism which render it a superior road roller. For example, instead of mounting the engines upon the boiler as is the practice in other steam rollers, the engines of the "Universal" are mounted horizontally on a separate engine frame, over the rear roll, hence out of the reach of the dust and dirt of the roadway. In addition, the engines are closely encased, as are also all driving gears. These features are commendable, as it is of great importance that the moving machinery be carefully protected from dust and foreign substances.

The boiler is of the vertical type and is placed independently in the frame of the roller. No moving machinery is fastened to it, so this important part of a self-propelling machine can fulfill its first duty (that of making steam) without being subjected to the severe strains resulting from the motion of a pair of rapidly revolving engines and the manipulation of the roller over rough ground. On the contrary, in rollers of the old three-wheeled type the boiler is made to act as the main frame of the roller and as a mounting for the engines. It is evident that this form of construction will result in manifold stresses upon the boiler shell, which will shorten the period of utility and prematurely weaken this important part of the roller. The vertical boiler has the advantage of eliminating all possibility of burning out the crown sheet or tubes of the boiler

when working upon steep grades. This is a difficulty which is often met when working with rollers with horizontal boilers upon hills.

On the "Universal" a seat is provided for the operator, who can, from his position on the front of the roller, reach all of the operating



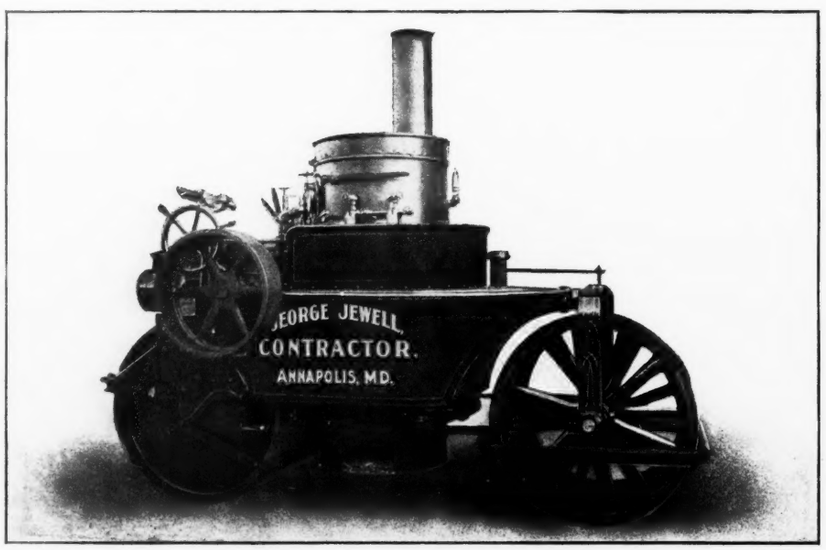
ROLLING ROADS IN LOWER MERION TOWNSHIP, PENNA.

mechanism which controls the machine. On the top of the boiler a coal hopper is placed where the fuel for replenishing the fire is carried. Leading from this storage bin into the fire-box under the boiler is a central firing tube which enables the operator to feed his fires without leaving his seat. This is one of the unique devices peculiar to this machine; another being a practical and simple power steering attachment on the larger sizes, which does away with the tiresome and continuous turning of the steering wheel which is necessary on heavy rollers that steer by hand.

Asphalt Trust Beaten in St. Louis

One of the most far reaching decisions against the Asphalt Trust has recently come from St. Louis. The Board of Public Improvements there specified the Bitulithic Pavement to be laid with Puritan Brand Cements. Col. Wm. H. Swift, President of the Fruin-Bambrick Company, one of the subsidiary companies of the Asphalt Trust, brought an action against the city, as a property owner on West Pine Boulevard, restraining the city from going ahead with the work on the ground that it was an artificial monopoly, created by the Board of Public Improvements by limiting the specifications. Judge Woods, who tried the case, had been the personal attorney of the Fruin-Bambrick Co. prior to its going into the asphalt trust, and undoubtedly had a special knowledge of his subject. The Judge decided against the asphalt trust on every point, holding that the Board of Public Improvements had provided for the most liberal kind of competition possible and consented with the class of work desired. The law in Missouri provides that before ordering any work full plans and specifications shall be adopted. This means that a particular class of materials must be specified. The Court in effect, held that they could not get the improvement covered by the Warren patents, without specifying the patented bitulithic pavement, and that the evidence showed that the bituminous cements manufactured by the Warren Brothers Company was superior to other classes of bituminous cements on the market for this purpose. The asphalt trust has already shown a willingness to lose large sums of money in its efforts to destroy all competition in other kinds of pavement, and it would seem that this decision is the hardest blow it has yet received. The members of the Warren Brothers Company, which is putting the bitulithic pavement on the market, were identified with asphalt manufacture before the trust organized, and are considered among the most expert users of bituminous substances in the United States. They have a string of patents embracing some three hundred claims, which were put in evidence in St. Louis, and which cover great improvements in the methods of manufacturing bituminous cements and preparing bituminous pavements. The bitulithic pavement is a stone pavement bound together with bitumen, using the stone in predetermined proportions so as to get it as near a solid mass as possible. It is claimed to offer many advantages in a practical and scientific way over the method of combining bitumen and sand. The bitulithic pavement is a bituminous concrete while the asphalt pavement is a bituminous mortar. The evidence in St. Louis showed that the Warren Brothers Company and its licenses had secured contracts for the bitulithic pavement in forty-eight cities in the United States, and that the pavement had been ordered for this year to an extent almost equal to all the asphalt paving used in this country.

It may be well to note that for the work on West Pine Boulevard, bids were presented by the Granite Bituminous Paving Company, the Ohio Bituminous Macadam Company, the Central Bitulithic Paving Company and the Nashville Roofing and Paving Company, and every applicant for license to construct the pavement was granted the same on contracting to purchase the necessary bitumen. On account of the temporary injunction the bids were returned to the bidders unopened by the Board of Public Improvements. The trial of the case commenced on February 27th, by oral testimony in the Circuit Court of St. Louis and lasted almost a week. There was a large amount of technical evidence presented, including some of the most prominent experts in the United States. The Judge handed down his decision on March 23d, vacating the injunction and sustaining



UNIVERSAL ROLLER SHOWING BELT WHEEL IN PLACE

the contention of the defendant, the city of St. Louis and its Board of Public Improvements in every point. West Pine Boulevard is one of the leading boulevards of the city of St. Louis, about two miles

in length and leading out to the Exposition Grounds. As the city of St. Louis is to expend a large amount of money in street paving prior to the Exposition in 1904, and as petitions have been received for the bitulithic pavement to be laid on a number of important streets this decision is very important to the city of St. Louis and the country in general, as affecting the condition of St. Louis streets. The battle was really one between the asphalt trust, of which the Barber Asphalt Paving Company is the active factor, which Company is bringing proceedings all over the United States which undertake to lay other than asphalt pavements, and the Warren Brothers Company. The Asphalt Trust has already annihilated, practically, every other paving concern in the United States and it is to the great benefit of American municipalities that they have been unable up to this date to sustain their efforts in putting the Warren Brothers Company out of the market.

The meat of the whole decision is in this extract from the opinion Judge Wood handed down:

"The grant of power to the Board of Public Improvements for the construction of streets is for public purposes and is for the benefit of the city and property owners. The prescription to let the contract to the lowest bidder is a mere regulation and not a limitation of the power. This proposition is illustrated in the case where, for instance, the city authorities have selected Nicholson pavement for a street, or Trinidad Lake Asphalt, which material in the one case is controlled by a patent and in the other case by a monopoly, and it has been held that the authorities, in the interests of the public, are not bound to wait, for instance, until a patent has expired or a monopoly has perished, so that competition may be secured, but may, in the exercise of their legislative discretion for the benefit of the public, select the patented or monopolized articles, and an ordinance requiring the use thereof is not void because the contract cannot be awarded the lowest bidder."

Utica Cement in Sewer Building

THE sanitary and drainage problem of Chicago is almost equal in magnitude to that of New Orleans. How to get rid of the surface drainage and handle the sewage of this immense city is no easy task. Sanitary engineers are very much interested in the sewer construction now under way in Chicago. The accompanying illustration shows a portion of the main south arm of the South Side intercepting sewer system, in the section near Forty-seventh street, between the Lake Shore and the Illinois Central tracks. This sewer connects with the Thirty-ninth street conduit, the water being pumped over into the conduit.

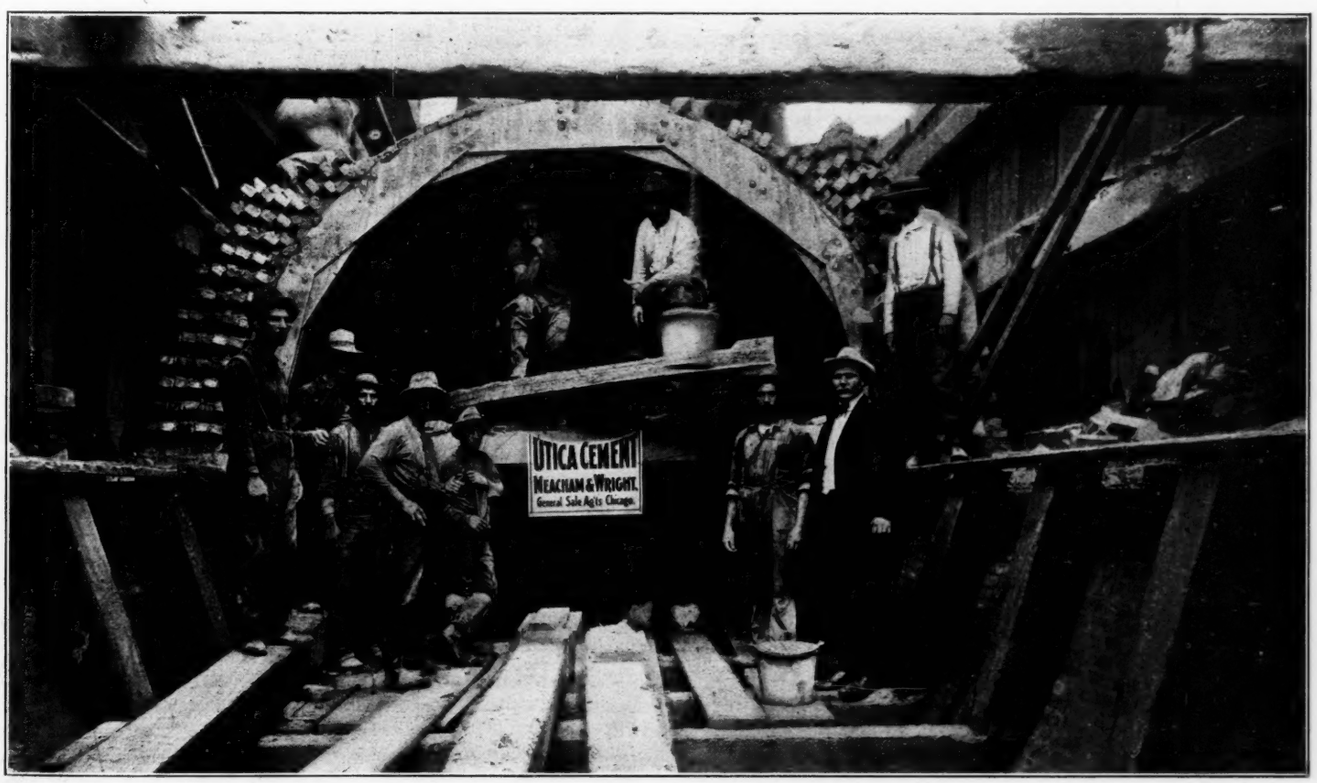
The inside diameter of this sewer is fifteen and one-quarter feet and is constructed in a twenty-five-foot cutting. The work on sections "G" and "H" is done by the city, day labor being employed; most of the other work is performed by contract. Commissioner Blacki and the consulting engineer, Mr. William S. MacHarg, are well pleased with the work already accomplished.

Meacham & Wright Company's cement—Utica cement—has been used entirely in this work, because of its being "smooth and buttery," as expressed by Mr. MacHarg. "It makes a great difference," said he, "in cost when the brick-layers are getting nine dollars a day, whether you lay 3,500 brick to the man or 4,500, and we have found out that we can even exceed the latter figure with the Meacham & Wright Company's Improved Utica cement."

The following was recently received from Robert W. Hunt & Company, engineers: "We hereby certify that on May 1, 1902, we established branch laboratories at the mills of the Utica Cement Manufacturing Company, and the Utica Hydraulic Cement Company, for the purpose of testing every car of "Clark Brand" and "Black Ball Brand" of Utica cement shipped.

"From May 8, 1902, to December 31, 1902, we tested 1,865 cars of the above brands, this being the total output for that period. Samples in each case were taken while the cars were being loaded for shipment.

"The average test of the 1,865 cars was as follows: Initial set, 65 minutes; final set, four hours, forty minutes; fineness on No. 50 sieve, 99.16%; fineness on No. 100 sieve, 88.16%; tensile strength, 24 hours neat, 91.18% per square inch; tensile strength, 7 days neat, 190.57% per square inch; tensile strength, 7 days, 2 sand and 1 cement, 166.22% per square inch. The above tensile tests represent a total of 21,990 briquettes."



SECTION OF CHICAGO INTERCEPTING SEWER IN WHICH UTICA CEMENT WAS USED EXCLUSIVELY IN CONSTRUCTION WORK

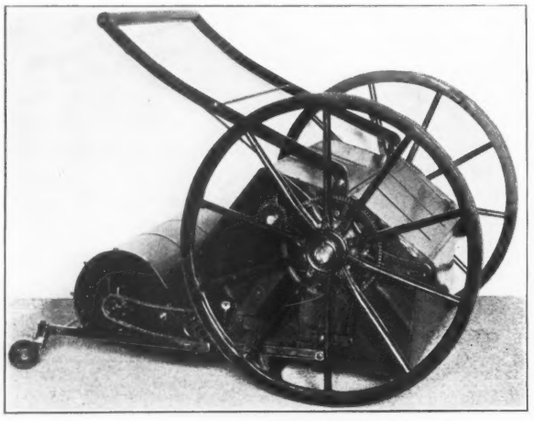
A Correction

In our March issue, on page 148, in the article entitled "A Paving Block Which Stands the Test," we said, "The manufacturer of this brick has shipped altogether, since the company commenced business in 1899, 14,000 car loads, aggregating about 80,000,000 of brick."

This is the annual output of this plant and not the aggregate since its origin, and there have been from sixty to seventy-five miles of streets paved every year instead of twenty-five as stated in this article. We were misinformed and regret that we have been made innocent parties in giving incorrect information regarding the business of this plant, but are glad to be put right and to place the correct figures before our readers. The Metropolitan Paving Brick Company, we are told, has the largest annual output of paving block of any plant in the world.

Hand Power Street Sweeper

The one-man-power street cleaning machine, manufactured by Messrs. E. H. Stroud & Co., 36 La Salle street, Chicago, Ill., will interest street cleaning superintendents everywhere, besides all others who are concerned about keeping the streets clean. The great trunk line railways are to be numbered among the great teachers of cleanliness, and constantly afford examples of cleanliness. For instance, this one-man-power sweeper is being used by many of the leading railroads of the country. At a recent test made in the presence of



NO. 2 MACHINE, WEIGHS 110 POUNDS

the officials, at the Union Passenger Station, Toronto, Canada, a man, walking at the rate of three miles an hour, with the No. 2 machine (shown by the accompanying illustration) cleaned a platform four hundred feet long by twenty feet wide in fifteen minutes. The width of the machine is twenty-eight inches, and in covering this area a lap of four inches was allowed for. When the rate of speed was afterwards reduced to two miles per hour the same area was covered in less than twenty-three minutes, and in both tests the machine worked with perfect satisfaction, picking up all the dust and refuse without creating a dust. Fuller particulars can be secured by addressing the manufacturer.

Catalogues Received

The return of the catalogue season has brought to our table a very attractive lot of booklets. Any of the following catalogues can be had for the asking:

—"The McKelvey Mixers, McKelvey Concrete Machinery Co., Chicago," is the only title of a 24-page catalogue, with cover, 6 x 9, which is well illustrated with page and half page half-tones and tells all about these celebrated concrete mixers.

—The Best Street Light Company, Canton, O., has issued a 48-page illustrated catalogue, 3½ x 6 inches in size, profusely illustrated, which tells about "the best incandescent vapor gas lamps."

—The St. Louis Expanded Metal Fire Proofing Company, St. Louis, Mo., has just issued a handsome 64-page catalogue, 6 x 9½ inches in size, descriptive of the use of expanded metal and filled with illustrations showing where it has been used in various forms of municipal construction.

—Flint & Walling Manufacturing Company, Kendallville, Ind., has issued two catalogues, one bound in cloth, containing 248 illustrated pages, octavo size, and the other, a 32-page illustrated catalogue, with paper cover, descriptive of tanks and sub-structures.

—The Studebaker Brothers Manufacturing Company, South Bend, Ind., has just issued catalogues No. 181, having 44 illustrated pages, with cover, size 6½ x 9 inches. This deals particularly with the patent improved sprinkling wagons.

—The Bucher & Gibbs Plow Company, of Canton, Ohio, has issued catalogue No. 103, 130 pages, with cover, size 6½ x 9½. Street superintendents will be particularly interested in the Imperial road or grading plow.

—"The Smith Mixer" is the title of a catalogue 5¾ x 9 inches, issued by The Contractors' Supply Company, Monadnock Building, Chicago. It has 16 pages with cover.

—The American Spiral Pipe Works, 64 Wabash avenue, Chicago, Ill., has issued a 16-page illustrated catalogue, 6 x 8 inches which describes and gives the price of spiral riveted pipe.

—The Downie Pump Company, Downieville, Pa., has issued a 56-page catalogue with cover, 6½ x 10¼ inches. It is attractively illustrated and tells all about the Downie deep well pumps and a few other things manufactured by this company.

—The Keystone Driller Co., Beaver Falls, Pa., has issued a 48-page illustrated catalogue, 3¼ x 11¾ inches. Its story of how to drill gas and water wells is what will interest municipal officials.

Morse-Boulger Destructor Co.

MR. MORSE

The Morse-Boulger Destructor Company, 39 Cortlandt street, New York, has received the announcement of the acceptance of its destructor, built for the United States Provisional Government at Manila, P. I. This is the largest installation of an American type furnace ever made, having a capacity of 150 tons per day of miscellaneous city waste, and to develop steam power for the production of electric light, forced draft, the moving of machinery, etc. The destructor is protected by a steel covering house, and the entire construction is said to be the largest in the Islands. The iron castings, steel and brick were shipped from this port in September last, and the construction has been completed in the remarkably short time of four months. This company has been asked to design three other destructors for the Government, to be used in connection with the municipal sanitary work of Manila.

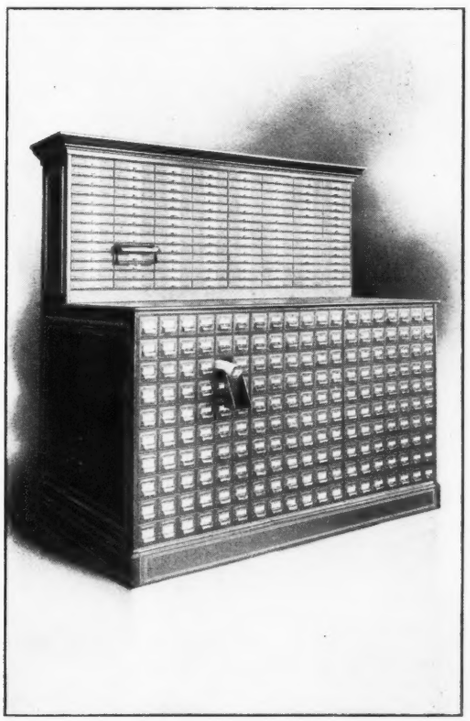
The Morse-Boulger Company has taken over the American patents and business of the Meldrum Brothers, Limited, of Manchester, England. This English company of destructor builders, has, in the last three years, contracted for upwards of sixty municipal destructor plants in Great Britain and the Colonies, all of which are equipped with steam boilers for utilizing the heat, and in more than one-half of these installations this power is employed by the city for the production of electric light, for pumping water and sewage, and many other municipal uses.

Plans and estimates for these improved destructors will be submitted by the Morse-Boulger Company, wherever the destruction of waste is contemplated on the North American Continent.

In the large field of work under its own patents this company has lately installed, or have in progress, the following destructors which are typical of its special classes of work: U. S. Government Disposal Station, Manila, P. I.; U. S. Navy Yard, Philadelphia; U. S. Immigrant Station, New York Harbor; Macy's new department store, New York; Lit Bros. and Snellenburg department stores, Philadelphia; new Astor Hotel, New York; new Hotel Bellevue-Stratford, Philadelphia; University of Michigan, Ann Arbor; Mt. Sinai Hospital and the Montefiore Sanitarium, New York, and others.

"Safe Filing of Plans"

In these days, when the annual ash heap of American cities aggregates a loss into the hundred millions, it behooves all cities to safeguard their public records. There is no department of a municipality, the important documents of which should be more thoroughly protected from fire than the plans, drawings and records of the engineering department. Many cities, particularly the larger and more progressive ones, have given this matter adequate attention, but the large majority have failed, thus far, to realize the need of using fireproof filing devices for valuable civic documents, particularly those which have to be kept outside of the vault. The steel cabinet illustrated herewith is a sample of a large variety which has been used in the equipment and furnishings of the City Hall of Minneapolis. This cabinet is adapted particularly to a city engineer's use. It is quite complete and can be safely used outside of a vault.

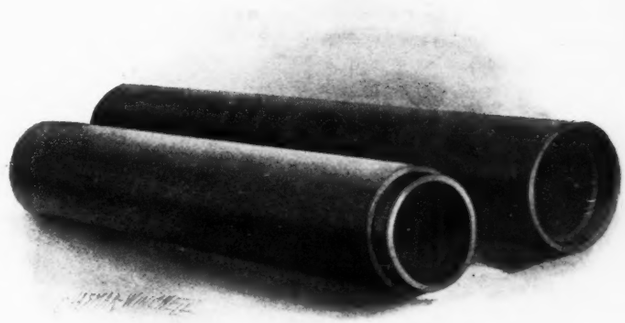


FILING CABINET FOR CITY OFFICE

The Art Metal Construction Company, of Jamestown, N. Y., for many years has manufactured cabinets and equipments in this line. The concern issues many atractive catalogues, any or all of which will be sent upon request. It makes cabinets and furniture of all kinds and they are not only indestructible either by fire or otherwise, but artistic in their design and finish. City halls and other public buildings should be equipped with handsome furnishings and we see no reason why civic authorities should begrudge a price a trifle higher than the ordinary furnishings when they can secure an article of so great merit coupled with the fire-proof quality.

Bitumenized Fibre Conduit

The necessity of placing all electrical wires underground, particularly in the business section in American cities, is self-evident. It is no longer a question of whether they should go underground or not, for necessity is conceded. The only question involved is how, and in what kind of conduits they should be placed underground. For this reason our readers will be interested in the bitumenized fibre conduit, shown in the accompanying illustration, manufactured by the American Conduit Company, which has factories and offices in Philadelphia, Chicago and Los Angeles. This conduit is patented and is electrolysis-proof, non-abrasive, moisture-proof and non-corrosive. It has stood an insulating test of 66,000 volts. It is made



in seven-foot lengths, from two to eight inches in diameter, and is strong, light and tough. When properly laid the joints are perfectly air-tight and water-tight. In the laying of the bitumenized fibre conduit there is little difficulty, and it can be done with rapidity and the expense involved is not great. It is said to be the easiest and smoothest duct for drawing cables through. Several million feet have stood the test of a number of years' use under various conditions by leading telephone, lighting and power companies, without deterioration.

The McKelvey Concrete Mixer

In the construction of concrete mixers under the McKelvey patents the aim has been, first, to build a machine that would produce the highest possible grade of mixed and evenly proportioned concrete; second, to make the machine a money-maker for the contractor—there is no reason why it should not save as much for the city. The simplicity of the construction and the durability of these machines, their light weight in proportion to capacity, their remarkable output in proportion to power required, make the various types of concrete mixers manufactured by the McKelvey Concrete Machine Company, of Chicago, Ill., exceedingly economical in operation. The portability of the machines enables them to be moved with little or no expense or loss of time.

There are seven sizes described in a recent catalogue of this company, ranging in capacity from twenty cubic yards per hour, run by a five-horse-power steam engine, weight, 6,000 pounds, down to a capacity of three cubic yards per hour, hand power, weight, 450 pounds.

The largest sized mixer is known as "The Improved Number 1," which is equipped with a first-class steam engine and is a high-class machine. Its capacity is guaranteed at twenty cubic yards per hour, but this can be increased by ten cubic yards per hour, of thoroughly mixed concrete, if kept constantly filled.

The materials, even the water, are deposited in it, in measured quantities, the feed gate raised and the entire mass quickly slided into the mixing drum.

Some contractors state they have been very successful in portioning the materials in wheelbarrows and dumping directly into the mixer. Others prefer a large slightly slanted platform hopper. There is absolutely no danger of choking or lowering the grade of the mixing by uneven and rapid feeding. This mixer discharges directly into the wheelbarrow.

"No. 5" is the smallest and cheapest machine built by this company. The frame is set on wood benches high enough to discharge into barrels. Its guaranteed capacity is three cubic yards per hour and a small gang of men can make excellent progress with this machine on light work.

It is well adapted for use by the sidewalk contractor as it makes the mixing of concrete for sidewalk purposes less expensive than that mixed by hand. Although small in size and light enough to be carried by a man, it is a good mixer and its low price brings it within the reach of the most unpretentious sidewalk builder. Machine mixed

concrete is always preferred and gives more uniform satisfaction. This small machine can be purchased for $125. Messrs. T. Nicholson & Sons Company, general contractors, of Chicago, in writing to the McKelvey Concrete Machine Company, under date of January 17th, had this to say:

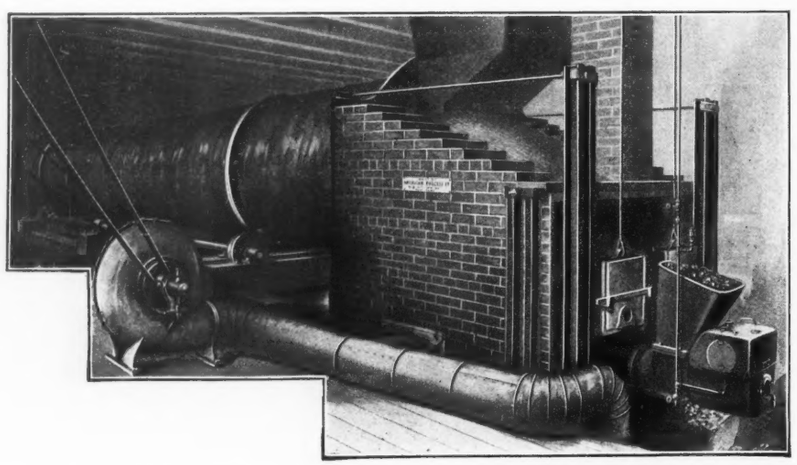
"In using your No. 2 McKelvey Concrete Mixer (steam power) purchased from you some six months ago, we have found it to be a most thorough and economical mixer.

"On a straight run of twenty-four hours we were able to mix 260 cubic yards of concrete, which for capacity is more than you guaranteed; at this speed the mix was most thorough.

"'Having used the mixer on over 10,000 yards of concrete for the caisson foundations of the First National Bank Building, this city, our experience with it is such, that we recommend it unreservedly."

Rotary Dryer for Reduction Plants

One of the burning questions before those interested in the improvement of the sanitary condition of American municipalities is involved in the collection and disposal of the garbage and refuse of cities in a sanitary manner. The American Process Company, 62 William street New York, has been a factor of no mean importance in securing a solution of the problem. It manufactures a direct heat



rotary dryer which is readily adapted to the use of garbage reduction plants, sand, scrap, night soil, fertilizer, fish scrap, etc. This dryer is the result of long experience and combines moderate cost of installation with great capacity; in fact, lowest cost for operation and maintenance. The New York Sanitary Utilization Company, which has the contract for disposing of the garbage of Greater New York at Barren Island, is equipped with four of the large sized garbage dryers manufactured by the American Process Company; another is used in connection with the disposition of the garbage of the city of Bridgeport, Conn. The sand dryers, of course, have been in use for a longer period as well as the process for handling all other materials, and can be found in almost every state in the Union.

In many cases, where filtration is necessary, the sand removed from the surface of the filter beds, can be used over again, at a very small cost, by this process of drying sand, which removes the organic matter deposited therein without injuring the sand as a filter medium. This dryer is also well adapted to the drying of precipitated matter, sewage filtration, night soil, etc. The dryers are manufactured in all sizes and in all capacities. Full information and data can be had on request.

Hollow Concrete Building Blocks

It has often been observed that this is essentially an age of new ideas. Our people are nothing if not progressive, and their entire existence may be taken as an exemplification of the doctrine that "the world moves." Of course, it is not merely sufficient that an idea shall be new; it must also be meritorious if success is to be the reward of its promulgation. When, however, newness and goodness are combined in proper proportions, there is nothing that can stand in the way.

Progress is the order of the day. Nothing can stop it. Whatever stands in the way is remorselessly run down, as the stage coach was by the locomotive in the first half of the last century. In the rush of improvements inventions which were valuable but a few years ago, are now superseded. It is in vain that interests, which it may be, cost enormously in treasure and labor, call out against destruction. The inevitable always happens; the sun puts out the light of the stars. Wise men do not quarrel with this law of progress. The better way they find to be is to put out more effort and strength in the race. If they do not keep up they must fall to the rear.

An interesting example of the wonderfully progressive tendencies of the times is to be found in the remarkable system invented and patented by Mr. Harmon S. Palmer, of Washington, D. C., and known as Palmer's Method of Concrete Building.

Briefly stated the advantages claimed for the Palmer concrete blocks are:

Saving in cost of construction.

Buildings constructed of these blocks are handsomer than those built of brick.

Buildings built of these blocks are fine and frost proof.

Insurance is less than for any other style of building. They are warm in winter; cool in summer.

They are free from rats, mice and other vermin.

The walls being lighter than solid walls require less foundation.

The time required for laying these blocks is one-third less than the time required for laying brick, and the mortar required is far less.

Buildings constructed of these blocks become more substantial with age, whereas buildings constructed with any other material diminish in strength.

The most elaborate designs of the architect can be moulded into the blocks, thus in a number of cases doing away with the use of galvanized iron-work. They require no backing of bricks. When the hollow block is laid the wall is complete inside and out, carrying floors, joists, beams and roofs. Plaster can be laid directly on the walls if so desired.

The sanitary conditions are superior to those of any solid wall, as the outside resists the rain and dries quickly, while a solid wall often remains damp all winter. The hollow space affords facilities for inserting gas and water pipes, electric wires, speaking tubes, ventilators, etc.

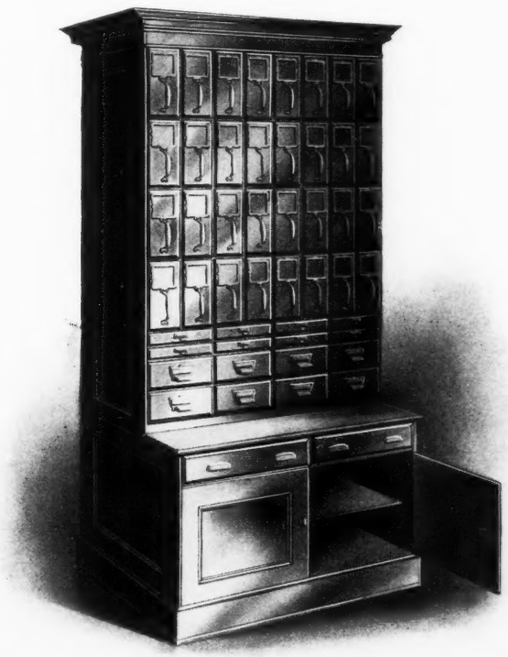
This is the cheapest system of construction in the erection of buildings known in the world to-day, and for strength and durability it surpasses any other system in existence, while its sanitary qualities bring this to a level with that of the telephone, electricity and electric light.

This system has been tested and tried under all sorts of conditions and circumstances, and in each and every case it has been found that it has more than justified even the largest claims that have been made on its behalf. That it is one of the greatest inventions of the age is incontestable, that it will be the means of transmitting to future ages the name of its illustrious originator is self-evident. To use the magnificent phrase of Dr. Johnson it is a system "which embodies the potentialities of wealth beyond the dreams of avarice."

—A new design for a garbage wagon,—which can be as readily used for the collection of ashes and street refuse,—made water tight and equipped with the celebrated Shadbolt dumping device, has just been perfected by the Shadbolt Manufacturing Company, of Brooklyn, N. Y. The designs already introduced are steadily growing in popularity. The *Engineering News*, in an elaborate description of the New York subway construction, said: "Various kinds of wagons were used, but particular success was had with the Shadbolt dumping wagon." Fuller particulars can be secured by addressing the manufacturer.

"Combination Cases in Steel"

THERE is no economy in equipping city halls and public buildings with inferior furniture and filing devices. This applies not only to the chairs, tables, etc., but particularly to the filing devices used for documents, plans, specifications, etc. The fire-proof quality of the furniture and filing devices of the General Fire-Proofing Company, which has its general offices and works at Youngstown, O., with



branch offices at 156 Fifth avenue, New York, and 1207 Merchants' Loan and Trust Building, Chicago, recommends it to the use of city officials everywhere. Too little heed now-a-days is given to the wisdom and necessity for preserving the valuable records of municipalities. It is a matter of almost weekly occurrence that we read in some local paper of the loss of valuable records because they were unprotected from fire. Complete catalogues can be had on request.

Concrete Steel Construction

NO BRANCH of engineering has made such rapid progress during the past few years as that relating to concrete and concrete-steel construction.

Stone has been replaced by concrete to a very large extent for the piers of bridges, retaining walls, dams, and for many other purposes for which weight and resistance to compression is required. Concrete alone is not capable of taking large tensile stresses, but this deficiency is overcome by embedding in the concrete steel bars in the proper location, and of the proper section and shape to take such stresses; and concrete-steel construction can be used for the greatest

THE THACHER PATENT STEEL BAR

variety of purposes, including bridges, girders, floors, sea walls, piers, docks, sewers, etc., it being particularly well suited for docks and sewers. The imbedded steel is thoroughly protected from rust, and the life of the structure is almost unlimited. It is important, however, that the embedded steel shall not slip, and the best device we have yet seen to prevent this is the Thacher patent bar which we illustrate. It does not depend upon adhesion, which may be destroyed by water, bad ramming or other causes, but gives a mechanical hold on the concrete which cannot be overcome. It has no sharp corners which tend to crack or tear the concrete, and the full strength of the bar will be developed under the most adverse conditions.

Notes of Interest to the Trade

—The address of the Pittsburg Filter Manufacturing Company has been recently changed from the Empire Building to the Farmer's Bank Building, Pittsburg, Pa. This company recently opened a branch office at 29 Broadway, which is in charge of Mr. R. Dorn.

—Mr. G. M. Gest, the conduit contractor, has been awarded a large contract for the underground conduit work in and around the "L" Street Central Station of the Edison Electric Illuminating Company of Boston, Mass. Also additional contracts by the Brooklyn Heights Railroad Company for the underground conduit along Flatbush avenue, Brooklyn.

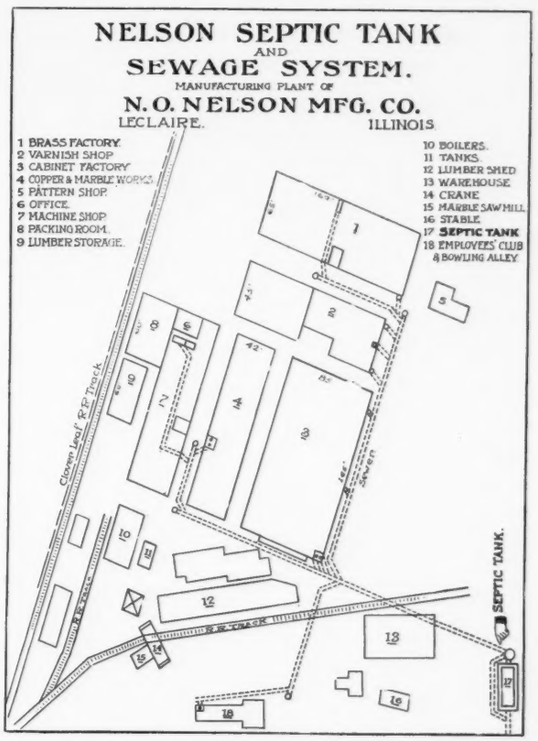
—The Allis-Chalmers Company will, on May first, remove its general offices from the present location in the Home Insurance Building to the New York Life Building, corner of Monroe and La Salle streets. The new offices will provide ample space for the various sales departments and general business offices. This move is another indication of the progressive spirit which animates this company.

Septic Tank Sewage Disposal

THE septic tank method of sewage disposal, as inaugurated in England and Europe years ago and more recently adopted by many American cities, is becoming more and more popular. The system, as it is manufactured by the N. O. Nelson Manufacturing Company, of St. Louis, Mo., will be of interest to our readers.

The company gives the following guaranty:

"We guarantee that the Nelson Septic Sewage Disposal System, when correctly installed according to our plans and specifications,



and furnished with our control fittings, will purify crude sewage to such an extent that the effluent or outflow will be free from objectionable odor or color."

This system is unsurpassed for schools, court houses, institutions, factories and other public buildings. The accompanying illustration shows how it is adapted to manufacturing plants. A booklet, giving full particulars, can be had on request.

WATER SOFTENING PLANT

PLANS have been prepared by the engineering department of the Pittsburg Filter Manufacturing Company for a "continuous flow" water softening plant with especial reference to railroad needs, embodying distinctly radical departures from hitherto accepted methods, as well as including features that will readily appeal to those familiar with the underlying principles governing the designing and operation of water softening plants. Aside from the various types of construction, there are two essentially different kinds of water softening plants—"continuous" and "intermittent." Each kind has its good points and the engineering officials of the various railroads are not a unit regarding the merits of the two kinds. Other things being equal, the "continuous flow" type meets with the most favor. There seems to be little doubt, however, but what the "intermittent" type is the better because more time is allowed for precipitation.

With the style of plant just designed by the local company, and which is meeting with approval on the part of the railroads, some novel features are incorporated. In a general way the process is this: "Raw water" from the city mains or from any source is admitted through a water motor, feeding through a six-inch pipe, to the precipitation tank, 30 feet high. Connected with the water motor are two "rakes," one operating in a "lime" reservoir, the other in a "soda" receptacle. As the water enters the precipitation tank, but before being discharged into it, the fluid is carried through a 12-inch pipe in which are placed a given number of "baffle" plates. Meanwhile the motor has forced the requisite amount of "lime water" or "soda water" into the 12-inch pipe, where, with the aid of the "baffle" plates, the water and the purifying agents are thoroughly mixed. After the water is thoroughly mixed it enters the open space in the precipitation tank, passes out through the filters and enters the roadside tub. Experts who have examined the new design unhesitatingly say that it far surpasses the older types of "continuous flow" plants. Under average conditions a plant with a daily capacity of 300,000 gallons would cost approximately $5,000.

The plant herein described is designed particularly for the supplying of purified water for locomotive consumption at a very low cost. The construction is simple and effective and a plant can be operated from the ground, there being no necessity for an employe to ascend to the top of the precipitation tank. The one objection, which is very slight, is that this type embodies a pressure tank, whereas the "gravity" system does not.

The advantages, however, are so numerous that this objection is reduced to almost nothing. Propositions coming from a number of railroads are being considered, and the coming spring and summer will witness extraordinary activity in the demand for purified water, since originally pure water seems beyond most of the roads in Pittsburg territory.—*The Pittsburg Post.*

NOTES OF INTEREST TO THE TRADE

—M. E. Ingalls, President of the "Big Four" Railroad, has been nominated for mayor of Cincinnati on the Democrat-Fusion ticket.

—The McKelvey Concrete Machinery Company will be located at 614 New York Life Building, Chicago, after May first. Until that time all communications should be addressed to 1206 Security Building, Chicago.

—Messrs J. D. Hurley and A. B. Holmes, formerly connected with the Standard Pneumatic Tool Company, are now associated with the Rand Drill Company, in the "Imperial" Pneumatic Tool Department at 128 Broadway, N. Y.

—Through the efforts of Mr. G. H. Moore, General Sales Agent, Chicago, Ill., the City of Three Rivers, Michigan, has awarded the contract for brick paving to Mr. James E. Conley, of Dayton, Ohio. Wassall block is to be used.

—Mr. J. B. Greer, of the Pittsburg Filter Manufacturing Company, recently read a paper before the Railway Club of Pittsburg on the "Purification of Feed Water for Boiler Use." Mr. Greer is well known as an authority on this subject.

—The Pittsburgh Meter Co., of East Pittsburgh, Pa., has recently issued an attractive little booklet of twelve pages, with handsome cover, dealing with the meter system versus the "flat rate" system. It would be sure to interest water works officials everywhere.

—The Carlinville Water Company is contemplating extensive improvements to its plant, subject to the approval of the City Council. The plans are for filtration works, large reservoir and several dams, now being made by Alvord & Burdick, 127 Hartford Building, Chicago.

—Wood pavement, which has been so much used in foreign cities for many years, in its new form, is becoming popular in American cities. The Borough of Brooklyn is now advertising for 16,000 square yards of this pavement, which in itself is an indorsement of the pavement as it is now being laid.

—Lyman C. Smith, former president of the Smith Premier Typewriter Company, recently announced the formation of the Hudson Portland Cement Company of Hudson, N. Y., with a capital of $6,000,000, which will begin the manufacture of cement from what are said to be the richest deposits in the country, some of which are located inside the city limits of Hudson.

—The City of St. Paul, Minn., has established its own street sprinkling plant and has made its first purchase of sixty wagons, forty of which came from the Austin-Western Company, Ltd., Chicago, and the balance were second-hand sprinklers purchased of the contractors who had been doing the work for the city. City Engineer Rundlett has given this matter a great deal of thought and attention and proposes making the plant second to none in the country.

—The Eureka Fire Hose Company recently organized a Factory Fire Brigade for the best possible protection of its large plant at Jersey City, N. J., and has just issued a book of "Rules and Regulations" governing same. The organization is to consist of a chief, fire marshal, engineer and six battalions, with a hose company, hook and ladder company, salvage corps and the entrance guards. All officers of the brigade, including foreman of hose companies, are required to become familiar with every valve and know how to shut off the sprinkler system at a moment's notice. Also how to cut out yard piping in case of a break and how to shut off gas or electric current from any section.

—The remarkable progress of the business of the Studebaker Brothers is graphically portrayed by a poster engraving printed in colors. At the top is a photographic reproduction of the original log cabin and blacksmith shop where the present Studebaker institution had its beginning; below is a picture of the Studebaker factories and offices as they exist to-day, covering one hundred and one acres. At the bottom of the poster is a portrait group of the five brothers who have brought so much to pass. It shows what pluck, perseverance and well directed energy may accomplish in America. A copy of this poster will be mailed to any address on receipt of six cents to pay the postage.

—Last month at South Bend, Ind., was dedicated the beautiful St. Paul's Memorial Church, of which the late Honorable Clem Studebaker, of the Studebaker Brothers Manufacturing Company, was one of the chief benefactors. He had, indeed, so much to do with it that the memorial services were given up to different addresses inspired by the benefactions of Mr. Studebaker. Rev. Dr. E. A. Schell spoke of him as "The Churchman;" the Hon. Marvin Campbell spoke of him as "The Citizen;" the Rev. W. E. McLennan, the former pastor, told of his "Home Life;" the Rev. S. W. Goss dwelt upon his "Spiritual Life," while his private secretary, Mr. Daniel S. Marsh, spoke of him as "The Employer."

LATEST NEWS FOR CONTRACTORS

Bids Wanted for Municipal Work—Franchises Granted—Contemplated Improvements—Contracts Awarded

PAVING

Terre Haute, Ind.—Brick pavement for Lafayette avenue is being advocated.

Malden, Mass.—$5,000 has been appropriated for new streets, and $4,000 for sidewalks.

Utica, N. Y.—A number of streets will be paved.

Norfolk, Va.—An appropriation of $50,000 has been asked for repairing sidewalks.

Fort Caswell, N. C.—Bids are wanted until April 6th for constructing roads. Philip Yost, Q. M.

Spartansburg, S. C.—The sum of $2,500 has been appropriated for opening Spring street.

Liveoak, Fla.—The question of paving is now under discussion.

Nashville, Tenn.—Bridge avenue will be paved with granite at a cost of $26,700.

Hartford City, Ind.—The paving of Jefferson street is under discussion.

Peoria, Ill.—Hamilton street is to be paved with brick as well as Glen Oak avenue.

Milwaukee, Wis.—Asphalt paving for Farwell avenue, and brick for Market, River and Johnson streets has been recommended.

Davenport, Ia.—Fifth street will be paved with brick.

Omaha, Neb.—The citizens are discussing the paving of M street.

Omaha, Neb.—A mass meeting will soon be held to discuss the paving of Railroad avenue.

Perth Amboy, N. J.—Washington street will be paved with brick, and Water street with asphalt.

Gloversville, N. Y.—Plans will be prepared for vitrified brick pavement on S. Main street.

Wyoming, O.—Bids will be received April 11th for street improvement bonds to the amount of $3,000.

Greenville, O.—Bids are wanted April 4th for furnishing material for improving parts of three streets. E. E. Calderwood, City Clerk.

Salem, O.—Bids are wanted April 3d for 28,000 square yards of asphalt block paving and 7,000 square yards fire clay block paving. George Holmes, City Clerk.

Philadelphia, Pa.—The first two miles of the Torresdale Boulevard will probably soon be built.

Erie, Pa.—$14,700 worth of bonds will doubtless soon be sold, this being the amount required to repave Fourth street.

Gonzalez, Tex.—It is stated that $7,000 worth of bonds were recently voted for street improvements.

Spokane, Wash.—Plans are now ready for the paving of North Monroe street. City Engineer Gill.

Tacoma, Wash.—Bids are wanted April 10th for 26,000 square yards of asphalt or bitulithic paving, and 3,000 yards cement walks. City Engineer Taylor.

Windsor, Ont.—Bids are wanted April 10th for furnishing the city with broken stone for macadamizing the street. City Clerk Lusted.

Bloomington, Ill.—Reports state that quite a little asphalt pavement will be laid during the summer.

Evanston, Ill.—Granite top macadam pavements have been suggested for Foster and Noyes streets.

Galesburg, Ill.—Houlton street and Grand avenue will probably be paved with brick on a sand foundation, which it is expected will cost about $16,000.

Quincy, Ill.—It is reported that bids will soon be asked for 4,500 square yards rock asphalt for paving Park place. F. L. Hancock.

Rock Island, Ill.—Fifteenth street will be paved with brick, about 15,000 square yards being necessary.

Evansville, Ind.—Bids are wanted April 18th for brick and asphalt paving on some twelve streets. City Engineer.

New Castle, Ind.—Bids will soon be asked for paving on streets with brick and asphalt.

Union City, Ind.—Plans for 7½ blocks of paving are now ready. E. M. Miller, Greenville, O.

Indianapolis, Ind.—The building of an asphalt plant is in contemplation.

Indianapolis, Ind.—$100,000 worth of bonds will be issued for boulevard purposes.

Auburn, Me.—The paving of Broad street will be undertaken this coming season.

Baltimore, Md.—McCulloch street will be paved, the cost of which is placed at $37,500.

Fall River, Mass.—Bids will soon be asked for furnishing 25,000 feet of granite and artificial steel bound curbing, and 225,000 granite paving blocks.

Trenton, N. J.—First-class cities will be required to spend $100,000 annually for improving and maintaining streets in accordance with the bill which has been signed by the governor.

McComb, Miss.—Sidewalk improvements will be made to the amount of $10,000.

Norfolk, Va.—$27,000 is the estimated cost of paving Fourth street.

Crawley, Ia.—Bids will be asked for the grading of all streets.

Bowling Green, O.—The macadamizing of Haskins Road is under consideration.

Celina, O.—Bids are asked until April 7th for paving East Livingston street with blocks or bricks. Village Clerk.

Columbus, O.—An ordinance has been passed which provides for paving in streets.

Findlay, O.—Bids are wanted until April 18th for paving with block, grading and also the sewering of Defiance avenue. City Clerk Ray.

Portsmouth, O.—The citzens are desirous of having Sixth street paved and to this end are circulating a petition to that effect.

Salem, O.—The council has passed ordinances which provide for the paving of New Garden and Howard streets, as well as East Broadway.

Toledo, O.—Reports state that bids will be readvertised for paving Auburn avenue.

Toledo, O.—Bids are wanted until April 13th for the paving of two streets with asphalt or blocks. City Clerk Nauts.

Charleston, Ind.—A special election will be held to decide the question of whether 18 miles of gravel road will be built.

Delphi, Ind.—Bids will be asked in the near future for the construction of roads. Auditor, Carroll County.

Evansville, Ind.—Bids are wanted until April 18th for 22,000 square yards of asphalt paving and 18,000 square yards of brick. City Engineer Pfafflin.

Fort Wayne, Ind.—The matter of paving Broadway and Calhoun street is being considered.

Indianapolis, Ind.—Plans will soon be ready for the Fall Creek and Pleasant Run boulevards. It is expected that this work will cost $100,000.

New Castle, Ind.—Bids will be asked shortly for paving with brick and asphalt. Town Board.

Williamsport, Ind.—On April 6th a contract will be let for building 10¼ miles of gravel road. W. H. Gemmer.

Bay City, Mich.—Considerable paving is contemplated the coming season.

Grand Rapids, Mich.—The citizens are discussing the matter of extending Hilton street.

New York City, N. Y.—Bids are wanted April 7 for about 200,000 square yards of asphalt pavement with binder course on present pavement as foundation, curbing and noiseless asphalt sewer covers. Jacob A. Cantor, President, Borough of Manhattan.

Rock Island, Ill.—Ordinances have been passed for brick paving on 15th street. City Engineer Treichler.

Des Moines, Ia.—13th street will be paved with asphalt.

Red Oak, Ia.—It is reported that brick paving will be ordered in the near future.

Fort Riley, Kan.—Bids are wanted until April 6th for brick paving. Capt. G. O. Cress, Q. M.

Leavenworth, Kan.—$6,539 will be spent for brick paving on Cherokee street.

Topeka, Kan.—The council has voted to pave thirty-nine streets.

Omaha, Neb.—The paving of 24th street is being contemplated.

Dallas, Tex.—The property owners on Main street are now considering the question of paving for that street.

Yoakum, Tex.—It is reported that bonds in the sum of $10,000 may be issued.

Chickasha, I. T.—A number of streets will be paved with brick.

Portsmouth, N. H.—$20,000 has been appropriated for the short boulevard.

Methuen, Mass.—The repaving and repairing of various streets is under consideration.

New Bedford, Mass.—$50,000 is desired with which to build a stone road.

Camden, N. J.—An ordinance for macadamizing the road from Haddenfield to Gibbsboro has been introduced.

Jersey City, N. J.—The asphalting of Harrison avenue has been reported on favorably by the street and water board. The cost is estimated at $5,000.

Austin, Tex.—Bids will soon be asked for the proposed street work.

Fort Worth, Tex.—A petition to pave East Belknap street with brick is in circulation.

Oklahoma City, Okla.—Paving plans to the amount of $400,000 have been adopted.

Oakland, Cal.—It is stated that San Pablo avenue will be paved with macadam.

Ogden, Utah.—It is stated that all streets not paved will be macadamized.

Minneapolis, Minn.—$200,000 in bonds will be issued for macadam roads.

Newport, Ark.—It is reported that $20,000 will be spent in paving the streets.

Peoria, Ill.—$8,592 will be spent in paving a portion of Hamilton street with brick.

Chicago, Ill.—A recommendation has been made to the city council that part of Archer avenue be paved. The cost is placed in the neighborhood of $60,500 and the material to be used, asphalt.

Spokane, Wash.—Plans are now ready for brick paving on Munroe street.

Walla Walla, Wash.—It is reported that $100,000 will be spent on paving.

Portland, Ore.—Reports state that brick will be used to pave Davis street, while macadam will be used for several other streets.

Berkeley, Cal.—It is reported that several streets may be macadamized.

Boise, Idaho.—Reports state that bids will soon be asked for brick paving on 8th street.

Chatham, Ont.—Asphalt paving on three streets is being considered.

Barrie, Ont.—Between three and four miles of cement walks will be built this year.

Montreal, Ont.—Paving and sidewalks will be built to the amount of $325,000.

Rensselaer, Ind.—This place has been authorized to issue bonds for gravel roads.

Essexville, Mich.—$25,000 worth of bonds will be issued here for paving.

Dallas, Texas.—This city is considering the question of an issue of $400,000 for good roads.

Denver, Colo.—It is reported that 15 miles of paving will be laid this season, as well as considerable sidewalk.

Tampa, Fla.—Bids will soon be asked for completing the Bayshore Boulevard. County Commissioners.

Atlanta, Ga.—It is stated that $3,000 will be spent for the purchase of a road roller. Pub. Works Com. of Co. Comrs.

Rockford, Ill.—It is now probable that a portion of 14th avenue will be macadamized.

Bloomington, Ill.—Graham street will be paved with asphalt. City Engineer Folsom.

Decatur, Ill.—It is reported that an ordinance has been adopted for the resurfacing of No. Water street with asphalt.

Terre Haute, Ind.—So. 4th street and Lafayette avenue will be paved with brick. City Engineer Sparks.

New Castle, Ind.—About one mile of brick paving will be laid here.

Indianapolis, Ind.—The $100,000 boulevard bond ordinance has been signed by the Mayor.

Cedar Rapids, Ia.—In all probability part of 6th street will be paved with macadam. City Engineer McCauley.

Paducah, Ky.—The pavement of seven blocks with brick is under consideration. City Engineer Washington,

Portland, Me.—It is reported that $17,483 will be spent for granite block pavement, and $12,252 for macadamizing. Com. George N. Fernald.

Falmouth, Mass.—It is reported that roads in this town will be macadamized to the amount of $50,000.

Grand Rapids, Mich.—The Board of Pub. Works has been authorized to advertise for bids for the paving of Wealthy avenue with vitrified brick. About 23,000 square yards of pavement will be required.

St. Paul, Minn.—The cost of paving on Dale street and Fairmount avenue is estimated as follows: sandstone, $12,083; asphalt, $8,547; brick, $9,311. City Engineer Rundlett.

Concord, N. H.—The Governor has signed the bill appropriating $20,000 for completing the shore boulevard.

Belvidere, N. J.—It is stated that $35,000 to $40,000 will be spent this year for the construction of 12 miles of macadam roads. It is the intention to improve from 12 to 15 miles of road each year, until all roads shall be in first-class condition.

Newark, N. J.—The City Council has adopted ordinances for paving with brick, asphalt, granite and telford macadam on a number of streets.

Paterson, N. J.—Paving with sheet or block asphalt on several streets is being considered. City Engineer Harden.

Brooklyn, N. Y.—Bids are wanted April 1 for regulating, repaving, grading, flagging and constructing cement concrete sidewalks on various streets. Engineer's estimate, 187,030 square yards granite block pavement with tar and gravel joints, for supplying and delivering 1,250,000 lbs. paving pitch, 35,880 square yards Medina sandstone pavement with cement joints, 10,470 square yards asphalt block pavement, 15,980 square yards wood block pavement 3 and 4 in. in depth, 19,510 cubic yards concrete, 86,715 square feet cement concrete sidewalks, 51,696 square feet bluestone flagging furnished and laid, 38,543 cubic yards earth filling, to be furnished, etc. J. E. Swanstrom, Borough President.

Toledo, O.—Bids are desired April 13th for supplying material and improving parts of two streets. City Clerk Nauts.

Cleveland, O.—Plans are being prepared of the speedway which is being talked of on the lower boulevard. Engineer Williams, Park Department.

Colina, O.—Reports state that bids are wanted April 7th for 10,270 square yards of block or brick pavement. Village Clerk Kreusch.

Williamsport, Pa.—A petition will be presented to the council for about 4,000 square yards of brick or asphalt paving.

Texarkana, Tex.—At a recent election it was voted to issue $30,000 in bonds for improving the streets.

Winnipeg, Man.—$10,700 will be spent for asphalt paving on Spencer street.

Shreveport, La.—Mayor Querbes has proposed a comprehensive scheme of paving which the council has approved. It is proposed to spend $230,727.30 for the paving of 4.49 miles of various streets. 2,112 feet of 3 to 6-inch sewer is to be laid at a cost of $19,930.49. A new city hall will also be erected.

SEWERAGE

Pine Bluff, Ark.—It is expected that $20,000 will be spent for three miles of sanitary sewers, the plans for which will soon be ready.

De Kalb, Ill.—Reports state that extension of the sewer system is under consideration by the council.

Indianapolis, Ind.—It is stated that $30,000 will be spent for building roads and a drainage system for the new army post in this vicinity. Major Miller has the matter in charge.

Ft. Wayne, Ind.—Plans and specifications will be prepared for a system of clay pipe sewers in several streets and alleys. City Engineer Randall.

Vincennes, Ind.—D. W. Weston is one of the directors of the Vincennes Sewer Company, which has recently been incorporated with a capital of $20,000.

New Albany, Ind.—Reports state that the construction of sewerage system is talked of. Henry Goetz, of New Albany, is interested.

Wyandotte, Mich.—A bill has been passed by the legislature authorizing the issue of $125,000 sewer bonds.

Hudson, Mich.—$15,000 in bonds will be issued for the improvement and repairing of the streets.

Canajoharie, N. Y.—Bids will soon be asked for the construction of a sewerage system. Village Trustees.

Ithaca, N. Y.—The construction of an outfall sewer is talked of. The cost is placed at $15,000.

Batavia, N. Y.—Reports state that $5,000 in bonds will be issued for the improvement of the sewer system.

Columbia, Pa.—If the recommendations of the boraugh president are carried out, an engineer will be engaged to prepare plans for a system of sewers.

Galveston, Tex.—A new sewer system, to cost $75,000, is being talked of for Fort Clark. Plans for same are being prepared at the office of Col. C. S. Riche, U. S. Engr.

Oconto, Wis.—A complete sewer system for the West Ward is being contemplated. City Engineer.

Galesburg, Ill.—New sewer work at this place is being talked of.

Sterling, Ill.—A sewer system for this place is contemplated.

Madrid, Ia.—Reports state that bids will be received April 6th for constructing 3,000 feet of 15-inch, 2,465 feet of 10-inch, and 478 feet of 8-inch tile sewer.

Chicopee, Mass.—It will cost $14,000 to extend the sewer in Broadway, and $4,000 in Academy street.

Gloucester, Mass.—The question of a sewerage system for this place is being considered by a special committee. W. L. Webber, City Engineer.

Port Huron, Mich.—A main sewer in 20th street will be constructed, bids for which will soon be received.

St. Louis, Mo.—The sewer on Blackstone avenue can now be constructed. The estimated cost of the work is $80,000.

Kansas City, Mo.—New bids will be asked for constructing the O-K sewer, which is estimated to cost in the neighborhood of $120,000.

Atlantic City, N. J.—It is stated that a plan for the drainage of the city has been prepared. The work is expected to cost about $500,000.

Asbury Park, N. J.—Beach and sewer bonds to the amount of $150,000 were sold in March.

Plainfield, N. J.—The contemplated extension of the sewer system is estimated to cost $65,000.

Buffalo, N. Y.—A sewage pumping station will be established here to pump sewage from the Hamburg Canal sewer into the Swan street sewer.

Bond Hill, O.—Bids are wanted on the 3rd of April for $40,000 worth of sewer bonds.

Cincinnati, O.—Plans and specifications will be prepared for a sewer on the south fork of Lick Run, as well as part of Pearl street.

Salem, O.—Bids for a sewer in parts of East Broadway street are wanted on the 3d of April.

Portland, Ore.—It is stated that sewers will be constructed in six different streets.

Ingram, Pa.—The citizens of this place will soon vote on a bond issue of $50,000 to be used in constructing a trunk line sewerage system.

Harrisburg, Pa.—A sewer will be constructed in Seneca street.

Lewiston, Me.—A discussion is being had on a system for this place.

Melrose, Mass.—An appropriation of $20,000 has been recommended by the mayor for a sewer system.

Revere, Mass.—Sewers in Shirley and Nahant avenues are being considered.

Johnstown, N. Y.—The residents desire a sewer in East Main street. J. W. Miller, City Engineer.

Nyack, N. Y.—$3,000 will be spent for a sewer in Washington avenue.

Penn Yan, N. Y.—Some time must yet elapse before a vote can be taken on the expenditure of about $65,000 for a sewerage system.

Rockaway Beach, N. Y.—$350,000 will be spent for a sewer system here.

Watertown, N. Y.—Pleasant and West Paddock streets will be provided with sewers.

Lower Marion, Pa.—Bids will be asked in about a week for a sewerage system and two pumping stations with a capacity of 750,000 gallons. Two reservoirs with 1,000,000 gallon capacity will also be built at a cost of $250,000. C. E. Albright, Land Title Bldg., Philadelphia.

Canton, O.—Bids are wanted until April 6th for 11½ miles of pipe sewers. P. H. Weber, City Engineer.

Elwood, Ind.—A petition has been made for the construction of sewers.

Indianapolis, Ind.—$4,000 has been appropriated for the city's share of the East Michigan street sewer.

Michigan City, Ind.—A sewer in Franklin street is being considered.

Terre Haute, Ind.—Sewers in Elm and Nineteenth streets are under consideration.

Peoria, Ill.—A hearing on the East Bluff sewer system was held on March 16th.

Sterling, Ill.—A sewer petition has been circulated.

Duluth, Minn.—Estimate for iron and vitrified pipe sewer along Polk street to St. Louis Bay has been submitted by City Engineer Patton.

St. Paul, Minn.—Bids will soon be asked for constructing sewers in Oxford street.

Austin, Tex.—Bids will shortly be asked for constructing 7,000 feet of 3-5½ ft. brick sewer.